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SPONS AGENCY	Office of Vocational and Adult Education (ED), Washington, DC.
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IDENTIFIERS	*National Standards

ABSTRACT

The American Welding Society (AWS) Education Grant Committee was organized in 1993 to unite employers, trade unions, educators, technical specialists, welding equipment manufacturers, and AWS members in efforts to develop national skills standards for training and certifying entry-level, advanced, and expert welders. Data were collected through the following activities: survey of industry and education representatives in all 50 states (20% of the 9,733 survey instruments distributed were returned); comparison of the survey findings with past AWS studies; and task analyses for all three welding skill levels. The survey and analysis results were used to develop the national standards, curriculum guidelines, and certification programs for all three welding skill levels. Fourteen related products/programs were also produced, including the following: specifications for the qualification/certification for the different skill levels, training guides, career guidance videotape, three certification programs, and program for schools willing to commit to using the curriculum guidelines and certificationi process. (Contains the following: summative evaluations of the efforts to develop standards and certification for all three welding skill levels; names/addresses of the 169 organizations from 36 states that participated in the project; brochure presenting the case for world-class standards; and transparency masters listing the standards.) (MN)

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ED 401 423

FINAL REPORT

U. S. DEPARTMENT OF EDUCATION

GRANT V 244 - B - 3006 - 95

CFDA NUMBER 84.244

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
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PRESENTED BY

THE AMERICAN WELDING SOCIETY

CE072915

FINANCIAL STATUS REPORT

(Short Form)

(Follow instructions on the back)

1. Federal Agency and Organizational Element to Which Report is Submitted U.S. DEPARTMENT OF EDUCATION	2. Federal Grant or Other Identifying Number Assigned By Federal Agency V244B3006-95	OMB Approval No. 0348-0039	Page of pages

3. Recipient Organization (Name and complete address, including ZIP code)

AMERICAN WELDING SOCIETY
550 N.W. LEJEUNE ROAD
MIAMI, FL 33126

4. Employer Identification Number 1-130434890-A1	5. Recipient Account Number or Identifying Number	6. Final Report ☒ Yes ☐ No	7. Basis ☐ Cash ☒ Accrual

8. Funding/Grant Period (See instructions) From: (Month, Day, Year) 07/05/93	To: (Month, Day, Year) 07/04/96	9. Period Covered by this Report From: (Month, Day, Year) 07/05/93	To: (Month, Day, Year) 06/30/96

10. Transactions:	I Previously Reported	II This Period	III Cumulative
a. Total outlays	499,239	1,079,781	1,579,020
b. Recipient share of outlays	250,000	269,394	519,394
c. Federal share of outlays	249,239	810,387	1,059,626
d. Total unliquidated obligations			0
e. Recipient share of unliquidated obligations			0
f. Federal share of unliquidated obligations			0
g. Total Federal share *(Sum of lines c and f)*			1,059,626
h. Total Federal funds authorized for this funding period			1,059,626
i. Unobligated balance of Federal funds *(Line h minus line g)*			0

11. Indirect Expense	a. Type of Rate *(Place "X" in appropriate box)* ☐ Provisional ☐ Predetermined ☐ Final ☐ Fixed			
	b. Rate	c. Base	d. Total Amount	e. Federal Share

12. *Remarks: Attach any explanations deemed necessary or information required by Federal sponsoring agency in compliance with governing legislation.*

13. Certification: **I certify to the best of my knowledge and belief that this report is correct and complete and that all outlays and unliquidated obligations are for the purposes set forth in the award documents.**

Typed or Printed Name and Title CHARLES O. WILSON GRANT/CONTRACT ACCOUNTANT	Telephone (Area code, number and extension) (305) 443-9353 Ext. 268
Signature of Authorized Certifying Official Charles Wilson	Date Report Submitted 7/29/96

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FINAL REPORT

PRESENTED TO THE

U. S. DEPARTMENT OF EDUCATION

OFFICE OF VOCATIONAL AND ADULT EDUCATION

GRANT AWARD NUMBER V 244 - B - 30006

PROJECT PERIOD

07/05/93 - 07/04/96

PRESENTED BY

DR. NELSON C. WALL

RECIPIENT PROJECT DIRECTOR

AMERICAN WELDING SOCIETY

NOVEMBER 1996

FINAL PERFORMANCE REPORT

GRANT V 244-B-30006

The reporting requirements for vocational and adult education projects funded under the Business and Education Standards Programs (84.244) are clearly presented in **EDGAR, 34 CFR 74.84**. Each project is required to submit a final performance report, a final financial status report (Standard Form 269), and a final external evaluation report. These three reports are due within ninety (90) days of the grant's ending date (including any no-cost extension period).

This final performance report has been formatted to incorporate the following sections:

1. Overview of the work performed during the thirty-six (36) months of implementation.
2. Deliverables produced under the grant.
3. Dissemination of deliverables.
4. Marketing of deliverables
5. Comparison of actual accomplishments to the objectives contained in the approved application.
6. Review of the schedule of accomplishments and their target dates contained in the approved application, and reasons for slippage in those cases where established objectives were not met. Corrective measures taken to correct slippage will also be presented.
7. Number and characteristics of project participants who completed planned project activities, and of those who did not, and the outcomes achieved by participants who completed project activities.
8. Evaluation activities conducted under the grant.

9. Changes in key personnel assigned to the project.

10. Project summary.

11. Companion documents and materials.

12. Closing statement.

SECTION 1

OVERVIEW

On June 2, 1993, the American Welding Society (AWS) was awarded a grant through the U.S. Department of Education to develop, organize and operate a business-labor-education committee, the AWS Education Grant Committee (EGC), that was to participate in the preparation of a skills standard and curriculum guideline leading to the certification of individuals as "entry level welders." The project title was "Business and Education Standards Program - Development of Standards and Certification for Entry Level Welders." Later, on December 20, 1994, an extension was awarded by the same grantor to also prepare similar materials for Level II - Advanced Welder, and Level III - Expert Welder. All three levels are incorporated into this report, as well as the activities and implementation performed during the total of thirty-six (36) months of the grant.

Education Grant Committee. The personnel invited to form this committee were a consortium of AWS members representing the interests of the following sectors:

* Business Community - The employers of welders.

* Trade Unions - The representatives of the welders.

* Educators - The trainers of welders.

* Technical - The intellectual leaders of welders.

* Welding Equipment Manufacturers - Providers of tools and equipment used by welders.

* American Welding Society - A professional organization representing the welding industry.

The process of developing the national skills standards, curriculum guidelines and certification program involved a combined effort on the part of industry-education, the AWS committee-AWS staff, and the following areas of occupational task analysis:

Needs Assessment. Two needs assessment instruments were developed to collect data concerning the job requirements for the three levels. These instruments consisted of a two part, two hundred and three item, direct mail survey to obtain industry and education feedback regarding hands-on skills, welding related knowledge, qualification testing, and foundation skills, such as reading, writing, math and listening-oral communication. From AWS membership roles, an original mailing list was developed. The total number of survey instruments distributed equaled 4,233 for Level I and 5,500 for Levels II and III. Return respondents equaled twenty percent, which were sufficient to validate the survey and allow the committee to continue working on the project. Our mailing sort was based on a 5:1 ratio of Experienced Welders/Supervisors (Foremen)/Technicians to all other job classifications included in the Standard Industry Code (SIC) for the survey. A broad range of industries and educational settings were included. This range reflected the overall membership of the American Welding Society. The mailing was done on a national basis, with respondents representing the fifty states, all types of businesses, all job classifications and all industrial or educational areas.

Needs Analysis. Data collected from the survey instruments was analyzed and compared against past American Welding Society studies to determine industry's requirements for employment at the three different levels. These additional studies included staff work related to welder skills and a DACUM (design a curriculum) facilitation consisting of a panel of experienced welding professionals who identified welder skills. Survey items were analyzed by comparing job classification group responses. Data was compared according to rank order of training scale assignment, and established mode and mean scores. Mode scores identified the highest number of responses to a particular rating. Mean scores identified the numerical average of all responses to an item, and established a location of this average on the rating scale. This information was then compared across groups, and any disparity of 0.50 or more between the mean and the mode range required further item analyzation. Once disparity issues were resolved, each survey item was assigned a numerical rate based on rating scale information.

As a result of the analysis conducted, a profile of each elder level emerged. Industry also revealed what we had already expected, that besides hands-on training and qualifications, a written test of welding related knowledge, welding procedures and safety was required.

Task Analysis. Expanding upon the information generated through the industrial surveys and the three welder profiles, a task analysis was performed for each skill level. The analysis process involved two stages: occupational data collection, and conversion to programmatic materials. The purpose of the individual task analysis was to establish the basis for developing a competency based training program for each of the three levels, and the preparation of knowledge- and performance-related activities for a given training objective. A typical task analysis identified the following information:

Occupational Data (from the workplace)

- Occupational description
- Occupational conditions
- Work area listing

- Occupational specialties (e.g., Arc Welding)
- Occupational subspecialties (e. g., Shielded Metal Arc Welding)
- Task listings (associated with the specialties and subspecialties)
- Performance steps of a task
- Standards of performance (when the task is done)
- Related information topics
- Workplace skill requirements
- Training materials, equipment and tools

Programmatic Materials (conversion to certification and training)

- Program title
- Course titles
- Unit titles
- Learning objectives (performance conditions, desired behavior, evaluation criteria)
- Recommendations for support personnel
- Recommendations for facility planning
- Reference material listing

Curriculum and Standard Development. The information identified during the task analysis for each individual level then went through a transition, which produced the corresponding Qualification and Certification document which is the Skills Standard. These requirements were established by voluntary consensus of the AWS Education Grant Committee. Once the standard was defined, the training needs were determined and the Curriculum Guideline for each of the three levels was produced.

SECTION 2

DELIVERABLES

The approved application required three products to be delivered for each of the three welder skills levels, and they are the following:

- National Standard for each of the three levels - Entry, Advanced, and Expert.
- Curriculum Guideline for training of each of the three levels.
- Certification Program for each of the three levels.

The American Welding Society has provided more deliverables than those required by the project. We have delivered the following:

1. AWS QC 10, *Specification for the Qualification and Certification for Level I - Entry Level Welder.*

2. AWS QC 11, *Specification for the Qualification and Certification for Level II - Advanced Welder.*

3. AWS QC 12, *Specification for the Qualification and Certification for Level III - Expert Welder.*

4. AWS EG 2.0, *Guide for the Training and Qualification of Welding Personnel - Level I - Entry Level Welder.*

5. AWS EG 3.0, *Guide for the Training and Qualification of Welding Personnel - Level II - Advanced Welder.*

6. AWS EG 4.0, *Guide for the Training and Qualification of Welding Personnel - Level III - Expert Welder.*

7. Three Certification programs are also in place, one for each level, and these are part of the existing Certification programs that cover the Certified Welding Inspector, Certified Welding Educator, and others generated before this grant.

In addition to the deliverables in the approved application, AWS has also produced the following deliverables at no cost to the grantor:

8. Catalog of AWS Publications for Welding Educators.

9. Brochure on the Program and Application for *Registration and Entry into the National Registry of Participating Organizations.*

10. Career guidance videotape cassette entitled *Heavy Metal, Hot Careers in Welding*, produced by the Miller Electric Mfg. Co.

11. Schools Excelling through National Standards Education - S. E. N. S. E. program for schools that are willing to commit to the use of the Curriculum Guidelines and Certification process.

12. AWS EG 2.0, *Guide for the Training and Qualification of Welding Personnel - Level I - Entry Level Welder* has been translated into the Spanish language and published as AWS EG 2.0 SP.

13. AWS has sponsored the formation of a Welding Honor Society with Chapters to be established at all educational centers participating in the S. E. N. S. E. program. The AWS Honor Society was named **Alpha Upsilon Sigma**, and will have its first group of candidates for initiation in April of 1997.

14. AWS produced a document under the title of *Guide to AWS Level I - Entry Level Welder, Level II - Advanced Welder, Level III - Expert Welder, Qualification and Certification.*

SECTION 3

DISSEMINATION

As defined in the approved application, the grantee published and printed ten thousand (10,000) copies of each of the first six items listed under DELIVERABLES, as well as the videotape. These were mailed to educational centers and educators in the United States. A copy of the total listing as generated from the data base, was sent to the grantor, together with copies of all the materials listed. As understood by the grantee, *dissemination* means getting information about the project and its products and processing out to all potential stakeholders, users, interested parties, and others. The mailing out of the 60,000 documents proved to be an excellent activity and to date, we are still receiving requests for additional copies of the subject documents.

SECTION 4

MARKETING

The first skills standard developed by AWS was made public in 1979. At that time we believed that industry-driven skills standards applied in the workplace can promote continuous improvement toward the desired goal of high performance workers and workplace. This has not changed since 1979. What is starting to change is the acceptance of the skills standards by the stakeholders and the Federal Government. The change is to some degree due to the continuing marketing effort of interested parties such as the grantee.

The responsibility for the development and management of the marketing plan for the skills standards was assigned to the AWS staff. Following the social marketing ideas and early models developed by Seymour H. Fine and published under the title *Social Marketing, Promoting the Causes of Public and Nonprofit Agencies,* the AWS staff developed their program with a few more than the original 4 P's of marketing (product, promotion, place and price).

The needs analysis done within our industry promoted the need for the standards being developed and the data generated defined the current needs of the industry workforce. By assessing the needs, we were able to establish a pool of potential participants, investors, users and sellers of the process. The Education Grant Committee represented a large number of the main stakeholders and they, too, were part of the dissemination process that leads to creating the market for the product. Many of the stakeholders started incorporating the skills standards into their industries as they became available. The promotional strategy utilized included trade press, in-house organs, skills standards newsletters, conferences and meetings, to name a few. Using the data base of the AWS sponsored **International Society of Welding Educators,** special promotional pieces on the skills standards Curriculum Guidelines were circulated, and the educators became very interested at an early point in the process.

As part of the marketing program we tried to provide products and services to the standards customers and the following are representative:

- Standards documents.
- Curriculum guidelines and audit materials.
- Certification information and requirements.
- Training programs geared to the Skills Standards.
- Assessment materials.
- Quality assurance systems and mechanisms.
- Feedback mechanisms for updating of the Standards.
- Guidelines for resource opportunities.

To encourage the adoption of the three standards, AWS organized the School Excelling through National Standards Education - **S. E. N. S. E.** - Program. Participating educational centers are enrolled in the AWS National Registry and receive a complete welding educator's library, and Institutional Membership in the American Welding Society. At present, there are over 180 schools in the program in thirty states of the nation.

SECTION 5

ACCOMPLISHMENTS

In this section of the report, the author will compare the actual accomplishments attained to the objectives contained in the approved application.

Objective. The American Welding Society (AWS) proposed to utilize its almost 75 years of technical, educational and standard developing experience in partnership with the Department of Education (DOE) to develop, organize and operate a business - labor - education - technical committee which will propose national standards and skills certification system for competency in the welding industry.

Accomplishments. The approved objective was met by the grantee and the following list of achievements highlight the results:

1. Invitation letters to the potential members of the committee were mailed out on June 15, 1993, fourteen days before the initiation date of the project.

2. The Education Grant Committee (EGC) held its first meeting on August 12, 1993, at the Marriott Casa Marina Hotel in Key West , Florida, starting at 8:30 AM.

3. EGC membership included two representatives from each of the following sectors: Business, Trade Unions, Education, Technical, Welding Equipment Manufacturers and the American Welding Society. The Executive Director of the American Welding Society was elected to serve as Chairman of the EGC.

4. EGC had twelve meetings between August 1993, and December 1994; nine additional meetings were held between January 1995 and April 1996. In other words, EGC met 21 times during the life of the project. Minutes of each meeting were circulated to the grantor following the formal meetings.

5. The committee developed the three skills standards, three curriculum guidelines and the certification system, together with the test bank now in use.

6. In addition the EGC developed the additional products listed in the **Deliverables** section of this report.

7. Individual members of the EGC interacted with industry leaders to promote the use of the skills standards developed by the grant. Many of them also met with local educational centers to interest them in becoming part of the S.E.N.S.E. program

8. EGC and staff members presented the skills standards at conferences, seminars and international meetings as part of the strategy to communicate with our peers in the industry.

9. Members of EGC and of the staff developed articles, white papers and editorials which were published in the *Welding Journal, State Directors, The Standards Bearer, USA Today,* and other publications with a national circulation.

10. The Governor of the State of Oklahoma awarded AWS a *Commendation* for its outstanding contributions to vocational education as a result of schools in the State joining the S. E. N. S. E. program.

11. The State of Florida has made it mandatory that all welding instructors be AWS Certified Welding Educators.

12. Vocational Industrial Clubs of America (V ICA) has incorporated parts of the hands-on tests required by the skills standards into their annual welding competition.

SECTION 6

SCHEDULE

The approved application contained a detailed schedule which we called *Education Grant Milestones*. This schedule was updated on a monthly basis and the Project Director included it in his monthly report to the U. S. Department of Education Program Director and the Grants and Contracts Division. During the life of the project, all objectives were met and the schedule showed no slippage. Only at the end, were we in need of requesting a no-cost extension of sixty days to allow time for the printing and distribution of the last of the three standards and curriculum guidelines.

Schedules were maintained and deadlines met due to the Program Management System that was designed and presented in the approved application document. A Program Manager was assigned to the project in July of 1993, and he was given overall responsibility and authority to manage the cost and schedule performance of the project team. The Project Manager prepared the task work orders, cost budget and work schedules using the Statement of Work (SOW), the Work Breakdown Structure (WBS) and the Education Grant Milestones schedule presented to the grantor in the approved application. Following the work orders, the responsible departments and personnel executed the work and reported progress to the schedule and budget on a weekly basis at the team performance review meeting. The Advisory Board, chaired by the Recipient Project Director, met monthly with the Project Manager to assess the program, review and advise relative problems while providing quality control feedback to the program team. When needed, this Board was empowered to act on behalf of the Executive Director and assign special assistance for problem solution.

The monthly reports presented by the Recipient Project Manager indicate that schedules were maintained, deadlines met and goals achieved in a timely manner. The only slippage was at the end of the program when a two month no-cost extension was requested to allow time for the printing and circulation of the third standard. The delay in part was due to the fact that bids for the printing of the products, at 10,000 units each, took longer than anticipated and as a result, the printing schedule was delayed. The corrective action taken was to request a no-cost extension from the grantor.

SECTION 7

PROJECT PARTICIPANTS

As presented in the outline, in this section we will identify the number and characteristics of the project participants who completed planned project activities, and of those who did not, and the outcomes achieved by participants who completed project activities. The project participants included both permanent members of the staff of the American Welding Society, as well as volunteer members of the Society. In selecting the participants, the Executive Director of AWS and the Recipient Project Director were certain to comply with all Federal statutes relating to nondiscrimination; these include, but are not limited to, discrimination on the basis of race, color, national origin, sex, age or handicaps.

Society Volunteers. There were sixteen volunteers that were involved in the project during the thirty-six months of implementation. Many others were indirectly involved as voting members of AWS Committees, Councils and the Board of Directors. Of the sixteen that formed the Education Grant Committee, all but three were voting members and the three were ex-officio members. The sixteen were representative of the welding industry and came from all areas of the nation. Two were females, one was black, two were from labor unions, one had a Ph.D., and one is a resident alien. Professional employment and titles cover welding supervisor, quality assurance manager, welding inspector, community college professor, university professor, director of training, chief welding engineer, qualification and certification, and others.

The volunteers in the Education Grant Committee operated as a team, so it is not possible to identify who completed project activities and who did not, because the team completed the activities on time and on budget. Some members were more active than others, and at times would be calling staff between meetings to clear up questions or to provide additional information. It would be unfair to say that some completed planned activities and some did not; as a matter of fact, the minutes of the meeting show that attendance was at all times above 90%. The volunteers working as educators, company administrators or technical staff were dedicated to the skills standards concept because in most cases, they were already involved in the implementation and usage of some of the other skills standards developed by AWS before this grant. The union representatives have implemented the skills standards into their apprenticeship programs and are making full use of the available material. As indicated earlier the educators were very effective in presenting the program to other educators and as a result we have this rather large number of schools in the **S. E. N. S. E.** program.

The Education Grant Committee participants formed the volunteer committee to create the subject standards. This is not a novel idea and the American Society for Testing Materials (ASTM), adopted the consensus principle in the development of standards in 1910. The American National Standards Institute (ANSI), a private membership organization that coordinates the U. S. voluntary consensus system does not create standards, but serves as a catalyst for standards development. The American Welding Society, as an ANSI member, follows the consensus principles of this organization and the Education Grant Committee members complied with all of the requirements. Because of this, it is very difficult to identify the work performed by the individuals, as all was done as a team project.

Society Staff. At least 50% of the staff participated in this project at one time or another during the 36 months of activity. Participation may range from a few hours to months of activity. There were four staff members on the Education Grant Committee (nonvoting) and an additional five on the project management team. The nine principal staff persons were all male, with professional backgrounds in administration, education, management, certification, finance, electronic data processing, and project design, to list a few. Most of the members are college graduates and two have Ph.D.s.

Following the generic phases of operating a system based on collaboration as defined by B. Gray in the book, *Collaborating*, staff tried to provide guidance in three areas as follows:

1. Problem Setting: Defining the problem, identifying stakeholders, gaining commitment, ensuring legitimacy of participants, identifying convener and securing resources.

2. Direction Setting: Setting goals, establishing ground rules, planning activities, establishing timetables and schedules, organizing work, developing delivery systems, and exploring options.

3. Implementation and Promoting: Setting up accountability mechanisms, identifying responsibilities, allocating resources, obtaining feedback, establishing evaluation and marketing mechanisms.

Under these generic phases, staff was able to provide a framework for the volunteers dedicated to the development of the skills standards. The members of the staff have worked together for many years, so it was very natural for them to become a team and perform as one. Again it would be unfair to indicate any individual as not having completed a planned project activity, but it is an indication of performance that most of the participating staff members hold high positions within the system and have been with the Society ten or more years.

In working with the volunteers, staff also tried to assist them in meeting the principles that state that standards must be developed to:

1. Respond to changing technologies and market structures.

2. Be benchmarked to world class levels of industry performance.

3. Be free from bias or discriminatory practice.

4. Be tied to measurable competence based outcomes.

5. Be developed in cooperation with a wide range of stakeholders in their industries.

6. Be useful for qualifying new hires, as well as upgrading the skills of employees.

7. Include basic reading, writing and critical thinking skills.

The products developed and presented in the **Deliverables** section meet the principles presented above.

SECTION 8

EVALUATION

In the approved application, the grantee listed three evaluation activities for the project as follows:

1. The rules of operation for the Committee incorporate interim formative evaluation by assuring balanced inputs into the standard-developing process. A public review period, wherein any interested party can review an inherent formative evaluation.

2. A Beta Test of the curriculum guideline and other educational materials as part of the development of these products.

3. A summative evaluation to be conducted by an independent third party.

All three of the evaluation activities were conducted during the implementation of the project; the first two were done as part of the development and the third was done at the end of the project. The summative evaluation (Level I and Level II and III) was conducted by Dr. Joyce L. Winterton under contract to AWS. The following highlights are offered at this time:

Conclusions - Level I

1. The project was soundly supported by industry and education.

2. The AWS project has reached the objective and met the commitment outlined in the proposal.

3. The project was well managed and implemented.

4. A broad dissemination plan to educators was implemented.

5. The project utilized a very thorough and specific process

6. The initial response from organizations to **S. E. N. S. E.**, the entry level welder standard and certification, has been extremely positive.

Recommendations - Level I

1. The process used by AWS for developing the standards and certification for Entry Level Welder should be used as a model for other standards projects.

2. AWS should continue the National Register of certified entry level welders and review whether or not the one year is ample time to be on the register.

3. AWS should work with industry to evaluate and document the success of the certification program in providing entry level welders who are better prepared to work and respond to industry's needs. If such documentation is possible, the employers in the industry should be encouraged to reflect this success in increased starting salaries.

4. Replicate the beta test of the curriculum with additional students to further document its benefits.

5. AWS should proceed with the development of standards and certification for other welding skills.

Conclusions - Level II and III

1. The project was soundly supported by industry and education.

2. The AWS project met the objective and achieved the outcomes outlined in the proposal.

3. The project was well managed and implemented.

4. The project utilized a proven process that can be used as a model for standards and certification development.

5. A broad dissemination plan to schools and institutions was implemented.

6. The National Registry established for Level II-Advanced Welder and Level III-Expert Welder can assist employers in hiring skilled welders. It will also benefit employees in marketing their welding skills.

7. The standards and certification assist in providing a *career path* for welders who want to improve their skills and advance in their employment.

Recommendations - Level II and Level III

1. The process used by AWS for developing the standards and certification for Level II and III Welders should be used as a model for other standards projects.

2. AWS should provide information on the results and benefit of maintaining a National Registry of certified advanced and expert welders to interested organizations.

3. AWS should work with industry to evaluate and document the success of the certification program in providing highly skilled, productive advanced and expert welders. If such documentation is possible, the employers in the industry should be encouraged to reflect this success in increased salaries.

4. The standards and certification should be revised every five (5) years as recommended by representatives of industry and education to keep it current with changing technology.

5. The American Welding Society should continue to implement strategies to inform industry and education about the national standards and certification and how to utilize them.

6. The AWS standards and certifications provide a framework that can be used to articulate secondary, postsecondary and industry welding programs.

SECTION 9

KEY PERSONNEL

The key personnel came from the AWS staff and were listed in the approved application under the title of Program Management Team. The original listing was as follows:

AWS Executive Director and Chairman of the EGC	Dr. F. G. DeLaurier
Project Director and Vice Chairman of EGC	Dr. N. C. Wall
Program Manager	C. R. Fassinger *
Needs Assessments	Dr. W. R. Oates *
Standards Certification and Test	L. P. Connor
Curriculum Development and Test	D. R. Grubbs *
Data Base	W. W. Wetmore *
Administrative System Support	R. J. Miedzialko

Of the eight key positions, the four marked with an (*) were changed during the thirty-six months of the project, and the reasons for these changes are as follow:

C. R. Fassinger. This person was moved to the position of Managing Director of the Technical Department and his new duties did not allow him time to continue working on the project.

Dr. W. R. Oates . He was promoted to the position of Editor of the Welding Handbook and again, due to his new duties, he had to give up his work on the project.

D. R. Grubbs. Resigned from the Society and went to work with another organization in Texas.

W. W. Wetmore. He too resigned from the Society and went to work with an organization in Miami.

The vacant positions were replaced with other senior members of the staff, as follows:

R. L. O'Brien, Managing Director of the Technical Department, took over the position of Managing Director Professional Services and replaced C. R. Fassinger.

D. Cantelope was hired to provide the project with the skills needed to conduct the needs assessment and to replace W. R. Oates.

R. V. Reeve was hired to fill the vacancy of Director of Education created by the resignation of D. R. Grubbs.

J. Cilli was also a new hire to fill the vacancy created by the resignation of W. W. Wetmore.

The EGC, in partnership with the key personnel and the AWS support staff, implemented this project and completed the eleven major tasks in the approved application, together with the formative and summative evaluation, as well as this final report.

SECTION 10

PROJECT SUMMARY

The sixteen projects funded by the U. S. Department of Education have used different approaches to define the knowledge, skills and abilities required to perform a job. These projects also demonstrated great diversity in terms of purpose, goals, products, development processes, coalition management, and decision making. The following project summary may be of assistance to anyone attempting to compare the sixteen projects:

Project Period	5 July 1993 - 4 September 1996
Federal Funding Source	U. S. Department of Education
Federal	$ 1,059,626
American Welding Society	1,383,764
Total	$ 2,443,390
Occupational Areas	Entry Level Welder (a semiskilled, production worker requiring close supervision). Advanced Welder (a worker with skills and capacity to perform proceduralized tasks under general supervision). Expert Welder (a worker with skills and demonstrated capacity for self-directed application as an autonomous worker).
Status	AWS QC 10, Standard for Entry Level Welder was published in March 1995. AWS QC 11, Standard for Advanced Welder was published in April 1996. AWS QC12, Standard for Expert Welder was published August 1996.
Standards	Each of the three standards establishes the basis for administering the individual program and defines the certification requirements.
Curriculum Guidelines	Each of the three curriculum guidelines contain learning objectives, performance conditions, desired behavior, evaluation criteria and learning activities necessary to accomplish training as a participating organization under the individual program.
Partners	The ESAB Group, Inc., Pacific Northwest Ironworkers, The Ohio State University, Miller Electric Mfg. Co., Moraine Valley Community College, Ingalls Shipbuilding, H&M Steel, Inc., Valmet Paper Machinery, National Training Fund, Oak Ridge National Laboratory, Dresser-Rand, Inc., Welding Engineering Supply Company, Bartley and Associates, NWF Consultants and the staff of the American Welding Society.

SECTION 11

COMPANION DOCUMENTS

The following documents are attached to this report. All of them have been circulated as they were produced, but by making them companion documents to the report, the reader will not have to search for them:

AWS QC 10, *Specification for the Qualification and Certification for Level I - Entry Level Welder.*

AWS QC 11, *Specification for the Qualification and Certification for Level II - Advanced Level Welder.*

AWS QC 12, *Specification for the Qualification and Certification for Level III - Expert Level Welder.*

AWS EG 2.0, *Guide for the Training and Qualification of Welder Personnel - Entry Level Welder.*

AWS EG 3.0, *Guide for the Training and Qualification of Welder Personnel - Advanced Level Welder.*

AWS EG 4.0, *Guide for the Training and Qualification of Welder Personnel - Expert Level Welder.*

Career guidance videotape entitled *Heavy Metal - Hot Careers in Welding.*

Roster of schools that have joined the *School Excelling through National Standards Education*, **S. E. N. S. E.**

Summative Evaluation Level I - Entry Level Welder by Dr. Joyce L. Winterton.

Summative Evaluation Level II - Advanced Welder and Level III-Expert Level Welder by Dr. Joyce L. Winterton.

SECTION 12

CLOSING STATEMENT

Welding has become a very sophisticated and technical science, requiring not only mental application but also hands-on abilities. From the production in leading-edge industries to pioneering research in modern laboratories, careers in welding continue to offer a very wide range of opportunities. According to the U. S. Department of Labor, Bureau of Labor Statistics, by the year 2005 the United States will need 352,000 welders, 80,000 welding machine operators, and 244,000 sheet metal workers. Welding as an enabling technology is used in the production of more than 50% of the gross national products in manufacturing. The future calls for competent welders and, as the need is recognized, the prompt acceptance of the skills standards and curriculum guidelines will greatly assist the training and educational process of the new generation of welders

The Recipient Project Director wishes to thank the volunteers and their companies for the assistance and cooperation that they provided. The support of the participating companies was a key factor in the implementation of this program. At the same time, he wishes to thank the staff of the American Welding Society for their contribution and dedication. The success of the project is due to the team effort of all the participants and their total support to the Recipient Project Director.

The American Welding Society thanks the U. S. Department of Education for this opportunity, and we look forward to continuing our work with the Federal Government and our industry.

Respectfully submitted,

Dr. Nelson C. Wall
Recipient Project Director

SUMMATIVE EVALUATION

THE AMERICAN WELDING SOCIETY

Development of Standards and Certification for Entry Level Welders

Submitted By:

Joyce L. Winterton, Ph.D.

August 31, 1995

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DEVELOPMENT OF STANDARDS AND CERTIFICATION FOR ENTRY LEVEL WELDERS

INTRODUCTION

The U.S. Department of Education was given authority under the Carl D. Perkins Applied Technology and Vocational Education Act to fund projects on a competitive basis to develop voluntary industry skill standards. Subsequently, the U.S. Department of Labor became committed to the concept of developing industry standards and expanding the development of the SCANS (Secretary's Commission on Achieving Necessary Skills) employability skills. Thus a collaborative effort was developed by the U.S. Departments of Education and Labor to facilitate the development of voluntary skill standards for various industries. In 1992 and 1993, these two departments funded twenty-two pilot projects (16 Education and 6 Labor) to develop voluntary skill standards covering some nineteen major industrial areas.

AWS STANDARDS AND CERTIFICATION

The American Welding Society (AWS) has almost 75 years of technical, educational and standard development experience. The 41,000 members of AWS represent all facets of the welding industry from hands-on welders to vocational instructors to industrial end-user companies and their engineering staffs. Both trade union members and management are represented within the Society. AWS is a technical standards producing organization with worldwide recognition. A system based on the American National Standards Institute (ANSI) "Procedures for the Development and Coordination of American National Standards" is used by AWS. These methods have been used to develop accepted standards for the training and certification of Welding Inspector and Welding Educator presently in use.

The American Welding Society submitted a proposal to the U.S. Department of Education to develop voluntary skill standards and certification for "Entry-Level" Welders. An Education Grant Committee was formed to guide and implement the project. The Committee members represented the following (refer to the appendix for a list of the members):

- Business Community - employers of welders such as fabricators, shipbuilders, aerospace
- Trade Unions - pipefitters, boilermakers, automotive
- Educators - vocational training instructors, post-secondary, college faculty
- Technical Community - welding engineers, designers, researchers, manufacturers of welding equipment and products.

SUMMATIVE EVALUATION PLAN

The summative evaluation was conducted by an independent evaluator, Dr. Joyce L. Winterton, through Winterton Associates. The evaluation assessed the effectiveness of the results of the standards development grant and its relevance and usefulness for both industry and education. Dr. Winterton has extensive experience working with industry and education as well as evaluation of projects.

The summative evaluation included five basic areas:

1. The results of the standards project in relation to the objectives outlined in the proposal including any modifications and the reasons for them.

2. The level of involvement of industry and employee/labor representatives in the development and verification of the standards.

3. The acceptability of the standards and certification to industry and their perceptions that the standards can be used to assess incoming employees and be adopted for current workers.

4. The level of involvement of education representatives in the standards development process and the acceptability of the standards for developing programs, curriculum and determining the proficiency of students through a beta test of the curriculum..

5. Unexpected findings or results that could be beneficial to other organizations developing standards and certification.

The Summative Evaluation included a survey of the Education Grant Committee and a random sample of respondents to the entry level welders documents. Dr. Winterton provided recommendations on ways to improve the skill standards process and outcomes. The data was analyzed and utilized for the summative report.

The summative evaluation compared the results and impact of the project to the framework and principles provided by the U.S. Departments of Education and Labor. The framework includes seven phases:

1. Development and solidification of the coalition of all industry partners--industry members, labor organizations, worker representatives, educators, student welders and state and Federal governments into a project management structure which will guide development, testing and implementation of industry standards and certification;

2. Identification of broadly-based occupations within the industry for which standards generally do not apply at present;

3. Development and validation of skill standards within the industry for the identified occupations.

4. Identification of appropriate training delivery mechanisms and processes for approving and accrediting appropriate training providers which would enable existing workers and new entrants to develop the skills to meet the industry standard;

5. Development and validation of methodology to assess new entrants and existing members of the workforce who wish to demonstrate their mastery of the industry standards;

6. Establishment of certification arrangements for recognition of achievement of the skill standards that will be recognized by employers within the industry, by relevant state and Federal government bodies and by the vocational and higher education systems; and

7. Establishment of implementation and marketing strategies to ensure:

    a. the adoption and utilization of the industry standards and certification at the individual employer, state, local and community college level;

    b. that processes are in place for the continuation of the project beyond the initial award to include all major non-baccalaureate degree occupations not covered in the initial pilot project and;

    c. that processes are in place to continuously update the industry-based occupational standards and to maintain the integrity of the skills assessment system and certifications processes.

The following principles were outlined to guide the standard projects' development:

1. Responsive to readily changing work organizations, technologies and market structures and based on broadly defined occupational categories within industries;

2. Benchmarked to world-class levels of industry performance and free from any gender, racial or other form of bias or discriminatory practice;

3. Based on a relatively simple structure to make the system readily understandable to users and tied to measurable, competency-based outcomes that can be readily assessed;

4. Developed cooperatively by all stakeholders and be comparable across industries, similar occupations and states;

5. Developed independently of any single training provider or type of training provider but applicable to a wide variety of education and training service providers, both work and

school-based.

6. Useful for qualifying new hires and for continuously upgrading the skills of employees; and

7. Include basic reading, writing and critical thinking (i.e. SCANS-type) skills.

The AWS Skill Standards project was highly successful in completing the phases as outlined in the framework. The principles identified to guide the Skill Standards project were also adhered to as much as possible.

EVALUATION OF IMPLEMENTATION

Project Organization

The project was organized with specific timelines, major milestones, management plan, committee and staff responsibilities that have basicly stayed on target. The Education Grant Committee remained actively involved throughout the project as evidenced by their meeting and teleconference schedule:

8/12/93 - Meeting
9/8/93 - Teleconference
10/30/93 - Meeting
12/14/93 - Teleconference
2/10/94 - Meeting
3/3/94 - Teleconference
4/8/94 - Meeting
5/11/94 - Teleconference
6/3/94 - Meeting
7/8/94 - Meeting
10/31/94 - Meeting
12/9/94 - Teleconference
2/23/95 - Meeting

The project staff also attended the following meetings conducted by the U.S. Department of Education for all the standards projects:

9/29/93 - Washington, D.C.
1/11/94 - Washington, D.C.
7/12/94 - Washington, D.C.

Project Objectives

The overall objective of the American Welding Society project "Development of Standards and Certification for Entry-Level Welders" was to operate a business/ labor/education technical committee which would propose national standards and skills certification system for competency in the welding industry. The project proposal outlined three products to be developed:

- National Standards for Entry Level Welders
- Curriculum for Training Entry Level Welders
- Certification Program for Entry Level Welders

The process to develop the standards and certification included the following components:

- Determination of the competencies through DACUM surveys: Industrial; Education
- Preparation of Standards
- Development of Curricula
- Preparation of Certification Information and Tests
- Development of Test Bank
- Certification of Students
- Development of Skill Update Methods
- Development and Maintenance of Skill and Certification Data Base
- Dissemination - Distribution

The plan projected that the DACUM survey would identify the duties and specific tasks of an Entry Level Welder, the general knowledge and skills required; the worker traits and attitudes needed; the recommended tools; equipment, supplies and materials needed; and appropriate formative evaluation techniques.

Modifications/Adjustments

The 1988 DACUM study "Occupational Analysis of Welder: Entry Level" was used as the basis for the survey. The plan was to send out 4,000 surveys with a projected 5 to 10% return. The actual mailing was to 4,233 using a ratio of 5:1 experienced welders /supervisors (foreman) /technicians to other job classifications included in the Standards Industry Code (SIC). A broad range of industries and educational settings were included. There were 857 or 20% of the surveys completed and returned. The results were used to develop a profile of the Entry Level Welder. The industry recommended that in addition to hands-on training and qualification, a written test of welding related knowledge and safety was required.

The Education Grant Committee developed the following definition of the Entry Level Welder:

> An individual who possesses a prerequisite amount of knowledge, attitude, skills and habits required to perform routine, predictable, repetitive, proceduralized tasks involving motor

skills and limited theoretical knowledge while working under close supervision.

The standards were utilized to develop the curriculum for training entry-level welders. AWS conducted a one cycle Beta test of the training curriculum in order to identify procedural weaknesses, and correct and refine the curriculum. Arrangements were made with Dade County Florida Public Schools to assist with the training following the curriculum guidelines set by the Education Grant Committee. The original plan was to have 25 students complete the Beta test; however, due to challenges of scheduling and students' ability to complete the curriculum four students actually completed the test. An evaluation survey completed by the students indicated that they felt positive about their training experience. A summary of the students' feedback is included in the Appendix.

Summary

National standards and certification for entry level welders did not previously exist. According to AWS, welders are important because the permanently join metals in an efficient and economic way. It is estimated that weldments produced account for up to 50% of the United States GNP--including almost everything we use in our daily life, from coffee pots to nuclear reactors. Overall the AWS project implemented the proposal as it was designed with a limited number of modifications. The implementation plan was ambitious, but was achieved due to the previous experience of AWS with standards, the dedicated staff and the active involvement of the industry.

The business, labor and education technical committee, the Education Grant Committee, successfully developed the National Standards and Certification system for Entry Level Welders. Both the standards and curriculum were disseminated to 10,000 schools and institutions. The certification program is well on its way to full implementation. Guidelines for schools to participate in the "Schools Excelling Through National Standards Education " (S.E.N.S.E) were developed and included in the materials disseminated. Schools complete a letter of commitment and agree to abide by all the requirements of the "Specification for Qualification and Certification" and the "Guide for the Training and Qualification of Welding Personnel". Participating organizations may agree to be training-and-testing or testing only facilities. To date, 50 organizations have applied to participate. In addition, the state of Oklahoma has adopted the standards state-wide. The states of Kentucky and Ohio are also pursuing a state-wide adoption. Individuals who are certified from the organizations will be listed in the National Registry of Entry Level Welders for one year.

As a result of the project following the implementation plan, the guideline are very specific concerning the standards and the certification. In addition, the training curriculum provides a uniform implementation process. A site visit by AWS representatives can be used to monitor the compliance of the training and testing facilities.

EVALUATION OF PROJECT OUTCOMES

Project Outcomes

The evaluation responses from the Education Grant Committee (EGC) agreed that the standards do reflect the needs of the industry. They also agreed that it is important to have the training curriculum for the standards. The EGC was asked to rate the importance of the outcomes and benefits of the entry-level welders standards project. The three most important outcomes based on the Committee's ratings were:

1 Commitment from major user groups (industry & education) that they accept and will support the standards.

2 The standards are developed, produced and disseminated.

3 Verification of potential employees abilities.

The most important benefits of the AWS Standards and Certification to industry were rated as:

1 Will help guarantee that the persons they hire are trained to start working.

2 Will help to move industry to a "high performance work organization" with high productivity.

3 Develop an industry standardized measurement of employee skills for entry-level welders.

The importance of the benefits of the AWS standards to education were rated as:

1 Increase the understanding of industry needs.

2 Provide a training curriculum.

3 Establish goals and measurements for classes, students, and for success.

In February 1995, the EGC rated the progress of the AWS project in achieving the following outcomes (using a scale of 5 successfully produced the outcome to 1 did not produce the outcome). The average responses are as follows:

3.4 Commitment from major user groups (industry & education) that they accept and will support the standards.

3.9 The standards are developed, produced and disseminated.

4.0 Verification of potential employees abilities.

4.0 The standards are easy to understand.

The three proposed products were developed during the project including the:

- National Standards for Entry Level Welders
- Curriculum for Training Entry Level Welders
- Certification Program for Entry Level Welders

When these products were disseminated, a random sample of 100 organizations who had received the AWS standards and certification materials were surveyed. In addition, 17 organizations who had signed up to participate in the standards and certification were surveyed. The response rate for the surveys was 29%. Four questions on the survey dealt with the process and outcomes of the project. Refer to the appendix for the summary of the evaluation forms.

Summary

Based on the surveys, respondents agreed that the standards were easy to understand and that they did identify the skills and knowledge for entry level welders. In addition, they agreed that the standards were developed for the appropriate sequential levels. The majority of respondents did agree that the standards should be revised every 5 years.

EVALUATION OF PROJECT IMPACT

Summative Evaluation Survey Results

Summative evaluation instruments were developed and administered at the following Education Grant Committee Meetings:

October 31, 1994 - Miami, Florida
February 23, 1995 - Key West, Florida

The summary of the evaluation instruments is included in the Appendix. Overall the responses from the Grant Committee members were positive about the project, its progress and the potential impact of the project.

In addition, a summative instrument was mailed to 100 recipients of the "American Welding Society Information Kit for Entry-Level Welders"and 17 organizations that had agreed to participate as training or testing facilities. The first mailing was sent on May 23, 1995 and a second mailing on July 24, 1995. The random survey instrument included 16 questions that dealt with the potential impact of the entry level welder standards and certification.

Potential Impact

According to a comment on an evaluation form from an EGC member, this project is one of the most worthwhile in which AWS has participated. It has tremendous potential to improve the skill level of the entry level welder and to make it more uniform across the country. Another EGC member stated that the standards and certification could eventually eliminate the need to test the skills of all welders when they are hired.

Based on the mailed surveys of summative evaluation, the majority of respondents agree (mean response of 4.0 to 5.0) that the standards project did have potential for a positive impact in the following areas:

- Help to improve the skills of entry level welders.
- Offer a reference mark for employers.
- Improve the respect of entry level welders.
- The training curriculum will improve the quality of education programs for entry level welders.
- Upgrade the skills of instructors.
- Help provide uniform training for welders.
- Provide industry with a better prepared welder.
- School administrators will have a tool to judge their welding programs.
- Employers will have a universal measure for existing and new employees.
- My organization will utilize the standards and certification.
- The development of national voluntary skill standards/certification is a beneficial effort.
- It is worthwhile to commit to the SENSE (School Excellence Through National Standards Education).

The survey respondents agree that there was also a potential for a positive impact in the following areas but not unanimously (mean response of 3.0 to 3.9):

- Improve the communications between industry and education.
- Implementing the standards and certification will challenge and motivate students.
- Through the standards and curriculum, students will be encouraged to become welders.
- The standards and curriculum will help parents understand that welding is a viable occupation.

Summary

Based on the review of the materials and feedback from industry and education the AWS project has been well worth the investment. Even though it was one of the more ambitious of the standards project, it has met and at times exceeded the proposed plan. The impact of the entry level welders, as perceived by EGC and education organizations, will be substantial. The expected benefits will likely be achieved. The evaluator commends AWS for their foresight and for the quality of the work completed.

CONCLUSIONS

1. The project was soundly supported by industry and education.
2. The AWS project has reached the objective and met the commitments outlined in the proposal.
3. The project was well managed and implemented.
4. The project utilized a very thorough and specific process.
5. A broad dissemination plan to educators was implemented.
6. The initial response from organizations to SENSE, the entry level welder standards and certification has been extremely positive.

RECOMMENDATIONS

1. The process used by AWS for developing the standards and certification for Entry Level Welders should be used as a model for other standards projects.
2. AWS should continue the National Register of certified entry level welders and review whether or not the one year is ample time to be on the register.
3. AWS should work with industry to evaluate and document the success of the certification program in providing entry level welders who are better prepared to work and respond to industry's needs. If such documentation is possible, the employers in the industry should be encouraged to reflect this success in increased starting salaries.
4. Replicate the beta test of the curriculum with additional students to further document its benefits.
5. AWS should proceed with the development of standards and certification for Level II and III welders.

APPENDIX

AWS EDUCATION GRANT COMMITTEE

F.G. Delaurier, Chairman	American Welding Society
N.C. Wall, Vice Chairman	American Welding Society
R.V. Reeve, Secretary	American Welding Society
R.L. O'Brien, Program Manager	American Welding Society
J. Bartley	Consulting Engineer
E.R. Bohnart	Miller Electric Mfg. Co.
S.W. Bollinger	The Esab Group, Inc.
F. Cusma	Pacific North west Ironworkers
J.E. Greer	Moraine Valley Community College
J.H. Ivy	Ingalls Shipbuilding
L.G. Kvidahl	Ingalls Shipbuilding
R. Murray	H & M Steel, Inc.
L.W. Myers	Dresser-Rand, Inc.
A. L. Petroski	Valmet, Inc. Honeycomb Division
R. C. Pierce	Welding Engineering Supply Co.
S.L. Raymond	National Training Fund
R. J. Teuscher	AWS Precision Joining Center
D. Howden, Ex-Officio	American Welding Society
J.C. Papritan, Ex-Officio	Ohio State University
C.E. Pepper, Ex-Officio	U.S. Department of Energy

SUMMATIVE EVALUATION

"SUMMARY OF EDUCATION GRANT COMMITTEE RESPONSES"

STANDARDS AND CERTIFICATION FOR ENTRY-LEVEL WELDERS

SUMMATIVE EVALUATION SUMMARY

SURVEY FOR THE EDUCATION GRANT COMMITTEE

10/31/94

Please respond to the following statements by circling the appropriate answer and filling in the blank where requested.

A. Reaction to the Process

	Disagree		Agree		Strongly Agree
1. I am satisfied with the results of the project thus far.	0	0	1	4	4
2. The standards will have broad acceptance by industry.	0	0	2	3	4
3. I am satisfied with the verification process (survey).	0	1	1	6	1
4. The process involved industry, education and labor.	0	0	1	2	6
5. The process involves an appropriate dissemination plan.	0	1	0	3	5

B. The AWS Draft Skills Standards

	Disagree		Agree		Strongly Agree
1. The skills are representative of skills needed by entry-level welders.	0	1	1	2	5
2. The Basic Education Skills are appropriate for entry-level skills.	0	0	2	2	5
3. The AWS draft Skill Standards are useful for developing training curriculum.	0	0	1	3	5
4. The Beta Test is an appropriate method to verify the training curriculum.	1	1	1	3	3

C. Testing and Certification

	Disagree		Agree		Strongly Agree
1. I can see the value of a voluntary national generic test for entry-level welders.	0	0	0	3	6
2. Certification will improve the skills of entry-level welders.	0	0	2	2	5
3. I would consider a person with these skills as a good prospect for employment in industry.	0	0	0	4	5

D. Objectives of the AWS Project

Rate the progress of the AWS Standards Project in meeting the following objectives on a scale of 1 to 5 (5 very effectively met the objective, 3 met the objective and 1 did not meet the objective).

4.2 1. Validated industry needs statement for an entry level welder competency standards.

4.0 2. Determining the competencies for "entry level welders".

4.3 3. Preparing and developing standards for "entry level welders".

4.2 4. Developing students' curriculum.

3.5 5. Preparing certification requirements and tests.

2.8 6. Development of test bank.

E. Outcomes of the AWS Standards and Certification

Rank the importance of the outcomes of the AWS Skill Standards (1 being most important and 5 being least):

2 The standards are developed, produced and disseminated.

1 Commitment from major user groups (industry & education) that they accept and will support the standards.

4 The standards are easy to understand.

3 Verification of potential employees abilities.

___ Other (please list):

F. Benefits of the AWS Standards and Certification

Rank the importance of the benefits of the AWS standards to industry (1 being most important,6 being least important):

3 1. Develop an industry standardized measurement of employee skills for entry-level welders

5 2. Identify national standards to build upon.

1 3. Will help guarantee that the persons they hire are trained to start working.

2 4. Will help to move industry to a "high performance work organization" with high productivity.

4 5. Establish training curriculum.

___ 6. Other (please list):

Rank the importance of the benefits of the AWS standards to education (1 most important, 5 least important:

2 1. Provide a training curriculum.

1 2. Increase the understanding of industry needs.

3 3. Establish goals and measurements for classes, students, and for success.

4 4. Help with instructor development and certification.

___ 5. Other (please list):

Positive Comments:

I think this project is one of the most worthwhile AWS has participated in. It has tremendous potential to improve the skill level of the entry level welder, to make it more uniform across the country. This will (hopefully) eliminate the need to test all of our new welders: if they are certified as an entry level welder.

Good input from industry, education and labor.

Excellent discussions from labor, education and industry. Rapid development of educational material and training standard.

Should improve working relationships between industry and education. Will reduce training time by industry.

Keep up the good work.

I believe that eliminating oxy-fuel gas welding from the curriculum for Entry Level Welders is an important step.

Excellent program to develop and make work. Much needed in schools and industry today.

Eventually, may eliminate the need to test skills of all welders hired.

Suggestions for Improvement:

Need to get started on 2nd and 3rd tiers of welder skill levels.

What industry wants in an entry level welder and what they are willing to pay for maybe different things. Should have broken entry level down into smaller segments.

The fact that industry helped determine the curriculum should be emphasized to the students. This should help them understand that what they are learning is meaningful.

Focus on important over-all development with all levels. Not word-smith each part. Don't slow progress, think of the overall goals and get on with the program!!!

Other:

Training improves skills, certification only confirms that a minimum level of skill is present.

SUMMATIVE EVALUATION SUMMARY 2/23/95

AMERICAN WELDING SOCIETY - STANDARDS FOR ENTRY LEVEL WELDERS

Please rate the following factors by circling the appropriate answer and filling in the blank where requested:

A. Development of the Standards

	Disagree		Agree		Strongly Agree
1. The project has a competent staff to direct it.	0	0	0	4	13
2. The development of the standards included appropriate industry representation.	0	0	0	7	11
3. The development of the standards included appropriate labor representation.	0	0	0	8	10
4. The perspective of educators was included during the development of the standards.	0	0	1	6	11
5. The draft standards were widely reviewed and validated by industry.	0	1	3	5	9

B. The Draft Standards

1. The standards reflect the needs of industry.	0	0	2	8	8
2. The standards identify the skills and knowledge required for entry level welders.	0	1	1	9	7
3. The draft standards are easy to understand.	0	0	3	11	4
4. It is important to have a training curriculum for the standards.	0	0	1	7	10

C. Impact of the Standards Project

1. The standards will improve the communications between industry and education.	0	1	6	8	3
2. The standards will help to improve the skills of entry level welders.	0	0	1	4	13
3. The standards and training curriculum will improve education.	0	0	1	11	6
4. The standards will offer a reference mark for employers.	0	0	0	11	7
5. The standards project will improve the status of entry level welders.	0	0	3	8	7

Please complete each of the following:

D. Outcomes of the AWS Project

Rate the progress of the AWS Standards Project in achieving the following outcomes on a scale of 1 to 5 (**5 successfully produced the outcome, 3 produced the outcome and 1 did not produce the outcome**).

3.4 Commitment from major user groups (industry & education) that they accept and will support the standards.

3.9 The standards are developed, produced and disseminated.

4.0 Verification of potential employees abilities.

4.0 The standards are easy to understand.

E. What are the three most important benefits of the Standards Project?

1. Industry had an input to training subjects.
2. The curriculum was beta tested
3. Students were challenged and motivated

1. Develop competent man power
2. Industry understanding of entry level.
3. Excellent source for training for industry.

1. A benchmark for all welder training in the U.S.A.
2. A certification program to effect their skills
3. Coordination of industry labor and education for the betterment of the student and their instructors.

1. Entry level welders all trained the same.
2. Will actually up-grade some instructors.
3. Will assist industry in knowing what they are getting from schools.

1. Set a standard for entry level welder's
2. Upgrade training.
3. Better workers.

1. Definition of requirements of an entry level welder by industry groups.
2. Communication between industry and education.
3. Develop the opportunity for performance certification for the individual.

1. Verification of employers abilities.
2. Reference mark for employers.
3. Reflect the needs of industry.

1. Identification of skills.
2. Identification of curricula guidelines.
3. Dissemination of curricula.

1. Standardization.

1. Industry driven.
2. Standard training system.
3. Acceptance by industry.

1. Status of entry level welders.
2. Reference for employers.
3. Improved training.

1. Establish standards for welders.
2. Establish education standards.
3. Industry will have a better welder coming in this door.

1. Standardized curriculum.
2. Establish entry level goal.

1. Employer has universal measure for existing and new employees.
2. School administrators have a tool to judge their welding programs by.
3. Variation in training programs may be potentially less.

1. It provides a uniform training curriculum for entry level welders.
2. It enables employers to have a standard level of competence/ability to expect from entry level welders.

1. Uniform curriculum transferable nationally.
2. Allows entry level welders to be placed nationally.
3. Gives industry a medium to tell education what is needed.

1. A benchmark to encourage schools and students to attain.
2. A method of helping to upgrade the profession.
3. A method of "serving notice" of the deleterious effects of disregarding the technical importance of welding and the part incorrect welding or failure to adhere to good welding precepts can have on the success of soundness of the structure.

1. Baseline for training and expected results
2. Standard format for education and qualification of entry level personnel.
3. Availability of materials for entry level training that has not been available in this quantity nor quality.

F. At the conclusion of the Standards Project it will be viewed successful if (complete the statement):

The students who completed the course get a job. Instructors follow the curriculum when they teach.

It is used and trains people go to work.

Every state adopts it for their welder training programs.

Most schools will use the standards.

The program is instituted by the state's Dept. of Education Individuals participate in the program. Industry employs the graduates.

They are used by industry.

A significant number of educational institutions adopt it.

Used.

Industry accepts them and employs individuals certified by this process.

Accepted by industry.

Industry and education will work to a standard to improve the welding.

Training facilities use the standards and employers look for the successful completion of training as a selection criteria.

Certification to this standard starts showing up on job applications in employment ads, and as part of customer-fabricator contracts. Schools start advertising certification as an outcome of their programs.

Training centers adopt it and use it. The welders who become certified have a higher level of skill than the current entry level welders. Industry recognizes and rewards/compensates these certified entry level welders accordingly.

Adopted by the educational system looked upon favorably by industries hiring. Changes the way secondary schools do business (more emphasis on training with work related basic skills).

If students and employers use the program to ensure they have qualified welding personnel.

After this material is disseminated to 10,000 institutions, it is really used and industry holds the trainers to preparing entry level personnel to this standards.

Other Positive Comments:

The workmanship samples are an indication of the results that can be expected when the curriculum is followed.

Creates an excellent guide, workmanship standards to train for industry needs.

Will raise the overall level of welder skill training in our nation.

I feel this has been something that will help industry and educators throughout the entire nation.
This will give welding instructors pride in what they are actually teaching.

Keep up the good work.

The interaction between the committee members was often dynamic and resulted in an excellent program.

Meets education 2000 goals and provides a guidelines for welding educators

This standard is long overdue but finally here. Will provide a national level of acceptability and ease training in different schools/states.

Staff conducted project professionally. Organization and presentation by staff to DoE clear, professional and led to further work.

It was a great project.

As beta test developer and trainer the transformation of students into beginning welders

I was very pleased to be part of an impressive and diverse group of people who are sincerely interested in improving the science and application of welding. It is always a pleasure to work with intelligent, skilled, hard-working people. Staff worked very hard and did a super job.

Prepare this material to be available both nationally and internationally.

Suggestions for Improvement:

Make sure that we have what we think and hope we have created - ie. training and testing proves our efforts are sound. The students really learned well, performed the skills and ready and able to do a good job in industry.

Needs to be monitored and updated with heavy input from industry. Must not let academics modify.

GO FOR IT!

The process of standards/guidelines development would have been facilitated by balloting the draft documents at an earlier stage. Almost 3 months of time could have been saved.

Follow-up with contacts in industry and education to sell project.

Continue and develop levels 2 and 3.

I personally think that the levels required by this standard and the training curriculum are too difficult for the student.

Lets get going on levels 2 and 3.

Stronger mandatory items in the standard. ie. certified welding educators tighten control of testing.

There is no way to force all schools to accept the program. I just hope our "salesmanship" will be successful.

More field testing to ensure that the curriculum and standards have the ability of being supported. Suggest all appropriate resources to teach the level and not just AWS standards. Provide suggestions or teaching tips on how best to use the guide and standards.

SUMMATIVE EVALUATION

"SUMMARY OF BETA TEST STUDENTS' RESPONSES"

STANDARDS AND CERTIFICATION FOR ENTRY-LEVEL WELDERS

SUMMATIVE EVALUATION

"SUMMARY OF BETA TEST STUDENT RESPONSES"

STANDARDS AND CERTIFICATION FOR
ENTRY-LEVEL WELDERS

SUMMATIVE EVALUATION SUMMARY

SURVEY FOR BETA TEST STUDENTS
AMERICAN WELDING SOCIETY - ENTRY LEVEL WELDERS TRAINING

Please rate the following factors by circling the appropriate answer and filling in the blank where requested:

A. Entry Level Welder Training

Strongly

	Disagree		Agree		Agree
1. The training program has been helpful.	0	0	0	1	3
2. The training program was challenging.	0	0	0	0	4
3. I am qualified to be hired as an entry level welder.	0	0	0	0	4
4. The entry level welder test was appropriate.	0	0	0	0	4
5. I was well prepared for the test.	0	0	0	0	4
6. I would recommend the training program to my friends.	0	0	0	0	4

Please complete the following:

I would improve the training program by:

The program should end earlier in the evening because most the students are working.

More classroom time.

No changes.

The best part about the program was:

Dan's commitment at the shop and Bob Reeve was very knowledgeable.

The teachers had real life experience thereby passing on this information.

Everything was just fine.

Additional Comments:

Having all this knowledge I got a job making $11.00 per hour. That was 2 months ago and now I have a dollar raise. I suggest you credit for this program

11945 Sentinel Point Court
Re[illegible]on, VA 22091

703/860-3475
Fax 703/716-3076

MEMORANDUM

TO: Recipients of American Welding Society Information Kit for Entry Level Welders

FROM: Joyce L. Winterton, Ph.D., Evaluator
Nelson Wall, Project Director, AWS

DATE: May 23, 1995

PURPOSE: Evaluation and Feedback on the Standards and Curriculum Guide for Entry Level Welder

Recently you received a package of information from the American Welding Society. It included the following:

- Specification for the Qualification and Certification for Entry Level Welders (AWS QC10)
- Guide for the Training and Qualification of Welding Personnel - Entry Level Welders (AWS EG2.0)

The project to develop national voluntary skill standards for entry level welders was partially funded by the U.S. Department of Education with matching funds from industry. An independent evaluation is required as part of the standards grant. Please take 10 to 15 minutes to complete the survey and return it in the enclosed envelope be JUNE 16, 1995. Your feedback is essential to the success of the standards project.

Thank you for your assistance.

Winterton & Associates

Examples of Correct Marking

Examples of INCORRECT Marking

0	0	0	0	0	0	0	0	0	0
1	1	1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8	8	8
9	9	9	9	9	9	9	9	9	9

Survey Form: **Entry Level Welders Skill Standards & Certification**

Survey Date: **May 17, 1995**

Instructions: Please complete this form completely (both sides, if applicable). Be sure to use only a number 2 pencil or black ink pen. Complete the box in the upper right corner of this form (as instructed).

		Strongly Disagree	Disagree	Somewhat Agree	Agree	Strongly Agree
1.	The standards are easy to understand.	○	○	○	○	○
2.	The standards identify the skills and knowledge required for entry level welders.	○	○	○	○	○
3.	The standards will improve the communications between industry and education.	○	○	○	○	○
4.	The standards will help to improve the skills of entry level welders.	○	○	○	○	○
5.	The standards are developed for the appropriate sequential levels.	○	○	○	○	○
6.	The standards will offer a reference mark for employers.	○	○	○	○	○
7.	The standards should be revised every 5 years.	○	○	○	○	○
8.	The standards and certification will improve the respect of entry level welders.	○	○	○	○	○
9.	The training curriculum will improve the quality of education programs for entry level welders.	○	○	○	○	○
10.	Implementing the standards and certification will challenge and motivate students.	○	○	○	○	○
11.	Through the standards and curriculum, students will be encouraged to become welders.	○	○	○	○	○
12.	The standards and curriculum will help parents understand that welding is a viable occupation.	○	○	○	○	○
13.	The standards and certification will upgrade the skills of instructors.	○	○	○	○	○
14.	The standards and certification will help provide uniform training for welders.	○	○	○	○	○
15.	The standards and certification will provide industry with a better prepared welder.	○	○	○	○	○
16.	School administrators will have a tool to judge their welding programs.	○	○	○	○	○
17.	Employers will have a universal measure for existing and new employees.	○	○	○	○	○
18.	My organization will utilize the standards and certification.	○	○	○	○	○
19.	The development of national voluntary skill standards/certification is a beneficial effort.	○	○	○	○	○
20.	It is worthwhile to commit to SENSE (School Excellence Through National Standards Education).	○	○	○	○	○
		○	○	○	○	○
		○	○	○	○	○

Positive Comments:

Suggestions:

Name (optional) ______________________________ State ________

Type of Company or School ____________________________________

Name of Company or School (Optional) _________________________

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HISTOGRAM REPORT                                          SURVEY: WELDERS    PAGE: 1

                        Welders Skill Standards & Certification

QUESTION    1: Standards are easy to understand.

                                            RESPONSE PERCENTAGE (/ 10)
      Response                    %
                                       .....1....2....3....4....5....6....7....8....9....10
   Strongly Disagree             0.0 |
 2 Disagree                      0.0 |
 3 Somewhat Agree               14.7 |
   Agree                        50.0 |
 5 Strongly Agree               35.3 |

 tal respondents =     34        Mean =  4.21          Std. Dev. =  0.68
 Non-respondents =      0     Non-respondents as % of total forms =  0.00

 ESTION    2: Standards indentify skills/knowledge for entry level.

                                            RESPONSE PERCENTAGE (/ 10)
      Response                    %
                                       .....1....2....3....4....5....6....7....8....9....10
 1 Strongly Disagree             0.0 |
   Disagree                      0.0 |
   Somewhat Agree               12.9 |
 4 Agree                        54.8 |
 5 Strongly Agree               32.3 |

 otal respondents =    31        Mean =  4.19          Std. Dev. =  0.64
 Non-respondents =      3     Non-respondents as % of total forms =  8.82

 UESTION    3: Standards will improve comm. bet. industry/ed.

                                            RESPONSE PERCENTAGE (/ 10)
      Response                    %
                                       .....1....2....3....4....5....6....7....8....9....10
   Strongly Disagree             0.0 |
 2 Disagree                      9.7 |
 3 Somewhat Agree               16.1 |
   Agree                        45.2 |
   Strongly Agree               29.0 |

 tal respondents =     31        Mean =  3.94          Std. Dev. =  0.91
 Non-respondents =      3     Non-respondents as % of total forms =  8.82
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HISTOGRAM REPORT                                           SURVEY: WELDERS    PAGE: 2

                          Welders Skill Standards & Certification

QUESTION   4: Standards will help to improve the skills.

                                          RESPONSE PERCENTAGE (/ 10)
      Response                    %
                                       .....1....2....3....4....5....6....7....8....9....10
 1 Strongly Disagree             0.0 |
 2 Disagree                      0.0 |
 3 Somewhat Agree               21.2 |██████████
 4 Agree                        48.5 |████████████████████████
 5 Strongly Agree               30.3 |███████████████

 tal respondents =     33        Mean =  4.09          Std. Dev. =  0.71
 Non-respondents =      1     Non-respondents as % of total forms =  2.94

 STION    5: Standards are developed for appr. sequent. levels.

                                          RESPONSE PERCENTAGE (/ 10)
      Response                    %
                                       .....1....2....3....4....5....6....7....8....9....10
 1 Strongly Disagree             0.0 |
 2 Disagree                      3.0 |█
 3 Somewhat Agree               12.1 |██████
 4 Agree                        69.7 |███████████████████████████████████
 5 Strongly Agree               15.2 |███████

 tal respondents =     33        Mean =  3.97          Std. Dev. =  0.63
 Non-respondents =      1     Non-respondents as % of total forms =  2.94

QUESTION   6: Standards will off a reference mark for employers.

                                          RESPONSE PERCENTAGE (/ 10)
      Response                    %
                                       .....1....2....3....4....5....6....7....8....9....10
 1 Strongly Disagree             0.0 |
 2 Disagree                      6.1 |███
 3 Somewhat Agree                9.1 |████
 4 Agree                        42.4 |█████████████████████
 5 Strongly Agree               42.4 |█████████████████████

 tal respondents =     33        Mean =  4.21          Std. Dev. =  0.84
 Non-respondents =      1     Non-respondents as % of total forms =  2.94
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                    Welders Skill Standards & Certification

QUESTION   7: Standards should be revised every 5 years.

                                          RESPONSE PERCENTAGE (/ 10)
       Response                     %
                                       .....1....2....3....4....5....6....7....8....9....10
   Strongly Disagree               0.0 |
 2 Disagree                        3.1 |▇
 3 Somewhat Agree                  6.3 |▇▇▇
   Agree                          40.6 |▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇
   Strongly Agree                 50.0 |▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇

Total respondents =    32        Mean =  4.38         Std. Dev. =  0.74
 on-respondents =      2     Non-respondents as % of total forms =  5.88

 ESTION    8: Standards/cert. will improve respect of entry lev.

                                          RESPONSE PERCENTAGE (/ 10)
       Response                     %
                                       .....1....2....3....4....5....6....7....8....9....10
 1 Strongly Disagree               0.0 |
   Disagree                        3.0 |▇
   Somewhat Agree                 24.2 |▇▇▇▇▇▇▇▇▇▇▇▇
 4 Agree                          36.4 |▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇
 5 Strongly Agree                 36.4 |▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇

Total respondents =    33        Mean =  4.06         Std. Dev. =  0.85
 Non-respondents =      1     Non-respondents as % of total forms =  2.94

QUESTION   9: Training curr. will improve quality of ed. prog.

                                          RESPONSE PERCENTAGE (/ 10)
       Response                     %
                                       .....1....2....3....4....5....6....7....8....9....10
   Strongly Disagree               0.0 |
 2 Disagree                        0.0 |
 3 Somewhat Agree                 26.5 |▇▇▇▇▇▇▇▇▇▇▇▇▇
   Agree                          41.2 |▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇
   Strongly Agree                 32.4 |▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇▇

 al respondents =    34        Mean =  4.06         Std. Dev. =  0.76
 on-respondents =      0     Non-respondents as % of total forms =  0.00
```

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                     Welders Skill Standards & Certification

UESTION  10: Implementing standards/cert. will challenge/motiv.

                                         RESPONSE PERCENTAGE (/ 10)
     Response                        %
                                       .....1....2....3....4....5....6....7....8....9....10
  Strongly Disagree                0.0 |
 2 Disagree                        9.1 |
 3 Somewhat Agree                 12.1 |
  Agree                           54.5 |
  Strongly Agree                  24.2 |

al respondents =     33        Mean =  3.94          Std. Dev. =  0.85
on-respondents =      1     Non-respondents as % of total forms =  2.94


ESTION  11: Students will be encouraged to become welders

                                         RESPONSE PERCENTAGE (/ 10)
     Response                        %
                                       .....1....2....3....4....5....6....7....8....9....10
 1 Strongly Disagree               0.0 |
  Disagree                         8.8 |
  Somewhat Agree                  38.2 |
 4 Agree                          47.1 |
 5 Strongly Agree                  5.9 |

al respondents =     34        Mean =  3.50          Std. Dev. =  0.74
 Non-respondents =      0     Non-respondents as % of total forms =  0.00


UESTION  12: Standards/curr. will help parents understand.

                                         RESPONSE PERCENTAGE (/ 10)
     Response                        %
                                       .....1....2....3....4....5....6....7....8....9....10
  Strongly Disagree                0.0 |
 2 Disagree                        9.1 |
 3 Somewhat Agree                 30.3 |
  Agree                           48.5 |
  Strongly Agree                  12.1 |

al respondents =     33        Mean =  3.64          Std. Dev. =  0.81
on-respondents =      1     Non-respondents as % of total forms =  2.94
```

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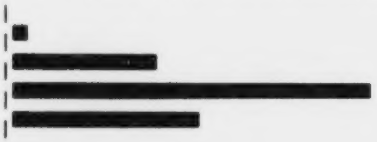
                 Welders Skill Standards & Certification

QUESTION  13: Standards/cert. will upgrade instructor's skills.

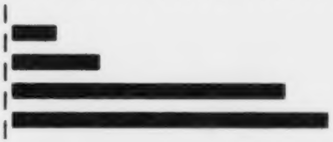
                                 RESPONSE PERCENTAGE (/ 10)
     Response                %
                              .....1....2....3....4....5....6....7....8....9....10
1 Strongly Disagree          0.0 |
2 Disagree                   2.9 |
3 Somewhat Agree            20.6 |
4 Agree                     50.0 |
5 Strongly Agree            26.5 |
```



```
Total respondents =    34        Mean =  4.00          Std. Dev. =  0.77
 Non-respondents =      0     Non-respondents as % of total forms =  0.00

QUESTION  14: Standards/cert. will help provide uniform trng.

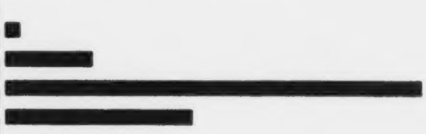
                                 RESPONSE PERCENTAGE (/ 10)
     Response                %
                              .....1....2....3....4....5....6....7....8....9....10
1 Strongly Disagree          0.0 |
2 Disagree                   5.9 |
3 Somewhat Agree            11.8 |
4 Agree                     38.2 |
5 Strongly Agree            44.1 |
```



```
Total respondents =    34        Mean =  4.21          Std. Dev. =  0.87
 Non-respondents =      0     Non-respondents as % of total forms =  0.00

QUESTION  15: Standards/cert. will provide industry w/better welders.

                                 RESPONSE PERCENTAGE (/ 10)
     Response                %
                              .....1....2....3....4....5....6....7....8....9....10
1 Strongly Disagree          0.0 |
2 Disagree                   2.9 |
3 Somewhat Agree            11.8 |
4 Agree                     58.8 |
5 Strongly Agree            26.5 |
```



```
Total respondents =    34        Mean =  4.09          Std. Dev. =  0.70
 Non-respondents =      0     Non-respondents as % of total forms =  0.00
```

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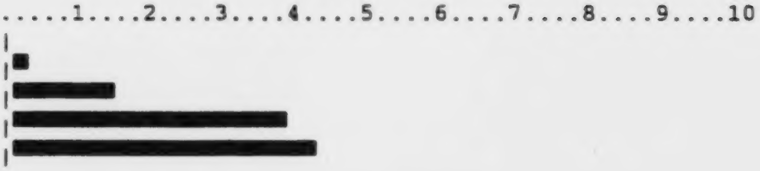
                       Welders Skill Standards & Certification

QUESTION  16: School admin. will have a tool to judge their prog.

                                                RESPONSE PERCENTAGE (/ 10)
     Response                        %
                                          .....1....2....3....4....5....6....7....8....9....10
   Strongly Disagree                0.0 |
 2 Disagree                         3.0 |
 3 Somewhat Agree                  15.2 |
   Agree                           39.4 |
   Strongly Agree                  42.4 |

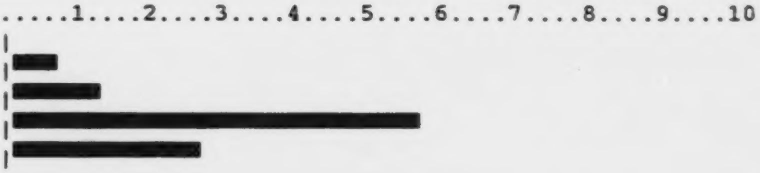
 al respondents =    33        Mean =  4.21          Std. Dev. =  0.81
 on-respondents =     1     Non-respondents as % of total forms =  2.94
```



```
  STION  17: Employers will have a universal measure for empl.

                                                RESPONSE PERCENTAGE (/ 10)
     Response                        %
                                          .....1....2....3....4....5....6....7....8....9....10
 1 Strongly Disagree                0.0 |
   Disagree                         5.9 |
   Somewhat Agree                  11.8 |
 4 Agree                           55.9 |
 5 Strongly Agree                  26.5 |

 otal respondents =    34        Mean =  4.03          Std. Dev. =  0.79
 Non-respondents =     0     Non-respondents as % of total forms =  0.00
```



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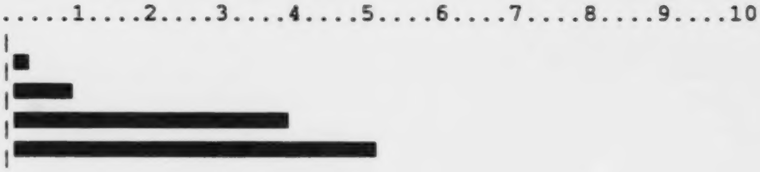
UESTION  18: My organization will utilize the standards/cert.

                                                RESPONSE PERCENTAGE (/ 10)
     Response                        %
                                          .....1....2....3....4....5....6....7....8....9....10
   Strongly Disagree                0.0 |
 2 Disagree                         3.1 |
 3 Somewhat Agree                   9.4 |
   Agree                           37.5 |
   Strongly Agree                  50.0 |

 al respondents =    32        Mean =  4.34          Std. Dev. =  0.77
 on-respondents =     2     Non-respondents as % of total forms =  5.88
```



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                        Welders Skill Standards & Certification

UESTION  19: Nat'l vol. skill standards/cert. is beneficial.

                                            RESPONSE PERCENTAGE (/ 10)
     Response                     %
                                      .....1....2....3....4....5....6....7....8....9....10
   Strongly Disagree             0.0 |
 2 Disagree                      5.9 |███
 3 Somewhat Agree                2.9 |█
   Agree                        26.5 |█████████████
   Strongly Agree               64.7 |███████████████████████████████

al respondents =    34      Mean =  4.50          Std. Dev. =  0.81
on-respondents =     0     Non-respondents as % of total forms =  0.00


STION  20: It is worthwhile to commit to SENSE.

                                            RESPONSE PERCENTAGE (/ 10)
     Response                     %
                                      .....1....2....3....4....5....6....7....8....9....10
 1 Strongly Disagree             0.0 |
   Disagree                      0.0 |
   Somewhat Agree               15.2 |███████
 4 Agree                        24.2 |████████████
 5 Strongly Agree               60.6 |█████████████████████████████

otal respondents =    33      Mean =  4.45          Std. Dev. =  0.74
 Non-respondents =     1     Non-respondents as % of total forms =  2.94
```

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STATISTICS REPORT                                    SURVEY: WELDERS    PAGE: 1

                    Welders Skill Standards & Certification

QUESTION: 1

Total respondents =    34          Mean =  4.21          Std. Dev. =  0.68
             Mode =     4        Median =  4
 Non-respondents =      0     Non-respondents as % of total forms =  0.00


QUESTION: 2

Total respondents =    31          Mean =  4.19          Std. Dev. =  0.64
             Mode =     4        Median =  4
 Non-respondents =      3     Non-respondents as % of total forms =  8.82


QUESTION: 3

Total respondents =    31          Mean =  3.94          Std. Dev. =  0.91
             Mode =     4        Median =  4
 Non-respondents =      3     Non-respondents as % of total forms =  8.82


QUESTION: 4

Total respondents =    33          Mean =  4.09          Std. Dev. =  0.71
             Mode =     4        Median =  4
 Non-respondents =      1     Non-respondents as % of total forms =  2.94


QUESTION: 5

Total respondents =    33          Mean =  3.97          Std. Dev. =  0.63
             Mode =     4        Median =  4
 Non-respondents =      1     Non-respondents as % of total forms =  2.94


QUESTION: 6

Total respondents =    33          Mean =  4.21          Std. Dev. =  0.84
             Mode =     *        Median =  4
 Non-respondents =      1     Non-respondents as % of total forms =  2.94


QUESTION: 7

Total respondents =    32          Mean =  4.38          Std. Dev. =  0.74
             Mode =     5        Median =  4
 Non-respondents =      2     Non-respondents as % of total forms =  5.88
```

```
                  Welders Skill Standards & Certification

UESTION: 8

tal respondents =     33          Mean =  4.06          Std. Dev. =  0.85
           Mode =      *        Median =  4
Non-respondents =      1     Non-respondents as % of total forms =  2.94

UESTION: 9

tal respondents =     34          Mean =  4.06          Std. Dev. =  0.76
           Mode =      4        Median =  4
Non-respondents =      0     Non-respondents as % of total forms =  0.00

ESTION: 10

otal respondents =    33          Mean =  3.94          Std. Dev. =  0.85
           Mode =      4        Median =  4
Non-respondents =      1     Non-respondents as % of total forms =  2.94

ESTION: 11

otal respondents =    34          Mean =  3.50          Std. Dev. =  0.74
           Mode =      4        Median =  4
Non-respondents =      0     Non-respondents as % of total forms =  0.00

ESTION: 12

otal respondents =    33          Mean =  3.64          Std. Dev. =  0.81
           Mode =      4        Median =  4
Non-respondents =      1     Non-respondents as % of total forms =  2.94

ESTION: 13

otal respondents =    34          Mean =  4.00          Std. Dev. =  0.77
           Mode =      4        Median =  4
Non-respondents =      0     Non-respondents as % of total forms =  0.00

ESTION: 14

tal respondents =     34          Mean =  4.21          Std. Dev. =  0.87
           Mode =      5        Median =  4
Non-respondents =      0     Non-respondents as % of total forms =  0.00
```

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                 Welders Skill Standards & Certification

UESTION: 15

 tal respondents =    34        Mean =  4.09         Std. Dev. =  0.70
            Mode =     4      Median =  4
 Non-respondents =     0     Non-respondents as % of total forms =  0.00

UESTION: 16

 tal respondents =    33        Mean =  4.21         Std. Dev. =  0.81
            Mode =     5      Median =  4
 Non-respondents =     1     Non-respondents as % of total forms =  2.94

UESTION: 17

 tal respondents =    34        Mean =  4.03         Std. Dev. =  0.79
            Mode =     4      Median =  4
  on-respondents =     0     Non-respondents as % of total forms =  0.00

 ESTION: 18

otal respondents =    32        Mean =  4.34         Std. Dev. =  0.77
            Mode =     5      Median =  4
  on-respondents =     2     Non-respondents as % of total forms =  5.88

  STION: 19

otal respondents =    34        Mean =  4.50         Std. Dev. =  0.81
            Mode =     5      Median =  5
  on-respondents =     0     Non-respondents as % of total forms =  0.00

  STION: 20

otal respondents =    33        Mean =  4.45         Std. Dev. =  0.74
            Mode =     5      Median =  5
  on-respondents =     1     Non-respondents as % of total forms =  2.94
```

SUMMATIVE EVALUATION SUMMARY

Entry Level Welders Skill Standards & Certification

"Mail Survey Responses"

Positive Comments

The program is good, long overdue but good. The obstacle now is to get existing educators motivated and qualified to present the material. If we as a nation do not implement this program, we're all going to see an increasing number of half-way trained welders.

Seem to be on track. My students are very alerted to this enhancement of the Welding Society and they are eager to complete and then be certified.

Push certification!!

I like having an organized format. I think there should be a section on employability skills. It will do us no good to train a student if we cannot get them a job and then they can keep it.

Carefully thought out and organized. Certification exam information is very helpful.

The Career Center's Welding Advisory Committee agrees with the standard for entry-level welder. We ar anxious to review the forthcoming standards for "skilled and journeyman/master" welder. Upon reviewing S.E.N.S.E. the immediate school administration was very positive toward implementation.

The standardization and qualification of welding personnel is long overdue. The "shade-tree" welder not only degrades this sophisticated technical science, but drive up the product liability insurance cost for the entire welding community. It's great to see the day of a welder being thought of in a negative way as disappearing. Please let's not stop with qualification and registration--let's move toward a formal license to practice our "art" of science and technology.

Good job!

Industry should be made aware nationally of the entry level welders skill standards and certification program.

I received great cooperation from the AWS office. The information received will surely assist us in putting together a viable and realistic educational experience in welding technology, up to and including an associate degree program. With ever expanding technology we must identify and propagate pertinent information for educational training. Both entry level and continuing education could and should be our common goal because of continual revisions to technology and codes and standards.

We needed to do this years ago and also all related trades.

Local industry are very supportive of our institution becoming qualified to certify graduates at the entry level as welders.

We are currently using these standards to write state curriculum with assistance from James Ivey.

This is a positive step in establishing a standard that can be used to improve welder training and testing nationwide. Those of us that have incorporated AWS codes and standards in our curriculum and welder testing programs will find this program easy to implement.

Suggestions

Mandatory CWE's/local school vo-tech directors must make CWE a pre-requisite for instructor's, while AWS should require C.E.U.'s and offer them for educators to continue their certification in the education areas, i.e. processes, new technology, industry/educator discussion forums. Industry must be willing to pay the wages for the better trained individuals. The salary structure for welders has either stayed the same or declined over the past 10-12 years.

These entry level welding standards are good. They establish a uniform standard for entry into the welding field. Given the scope of the standards and the amount of instruction, learning, and practice time involved, I believe it will be extremely difficult to implement these standards in a vocational high school setting. Even in a state such as Massachusetts which has a system which allows up to 1500 hours for vocational training over a 3 year period, it will be practically impossible. Instructors will probably want to use some of the material for their programs, but I think it is unlikely that the entire program would be implemented.

Curriculum does not motivate students. In fact active learning programs and accountability through testing threatens those students who do not work hard. These loafers will complain loudly when an attempt is made to force them to work. A strategy must be in place to handle the complaints that will be forthcoming from students who wish to be entertained rather than learn.

Business and industry needs to tell education this is what they expect. Then business and industry need to go about seeing schools provide the high level of training the "Guide" outlines.

The accompanying tape "Heavy Metal" is somewhat sexist and will not help to expand the interest of young women in the career area. You may want to re-look at the P.R. piece.

Due to Federal and State laws the "screening process" is a major hold point. It appears that only if a program has a large student population can a selection process be viable. The pool of students varies year to year and it is doubtful that there will be enough interest generated for this to take place. After all. welding is an elective type course and is not mandated as with

English, Math, History, etc. If there is a way to circumvent this issue, please let me know immediately.

I hope there will be an effort to develop higher levels i.e. 2, 3, master. I feel this will encourage students to stay in the field if they know a person can progress their whole career.

The availability of these standards were somewhat premature. I am still unsure if all the necessary documents and educational materials have been received. Also, it is unclear if and when future information and information should be received.

I will hold suggestions for a later date. We want to work with the program before we evaluate and make suggestions.

SUMMATIVE EVALUATION

THE AMERICAN WELDING SOCIETY

Development of Standards and Certification for Level II and Level II Welders

Submitted By:

Joyce L.Winterton, Ph.D.
Winterton Associates

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DEVELOPMENT OF STANDARDS AND CERTIFICATION FOR ENTRY LEVEL WELDERS

INTRODUCTION

The U.S. Department of Education was given authority under the Carl D. Perkins Applied Technology and Vocational Education Act to fund projects on a competitive basis to develop voluntary industry skill standards. Subsequently, the U.S. Department of Labor became committed to the concept of developing industry standards and expanding the development of the SCANS (Secretary's Commission on Achieving Necessary Skills) employability skills. Thus a collaborative effort was developed by the U.S. Departments of Education and Labor to facilitate the development of voluntary skill standards for various industries. In 1992 and 1993, these two departments funded twenty-two pilot projects (16 Education and 6 Labor) to develop voluntary skill standards covering some nineteen major industrial areas.

AWS STANDARDS AND CERTIFICATION

The American Welding Society (AWS) has almost 75 years of technical, educational and standard development experience. The 41,000 members of AWS represent all facets of the welding industry from hands-on welders to vocational instructors to industrial end-user companies and their engineering staffs. Both trade union members and management are represented within the Society. According to AWS, welders are important because they permanently join metals in an efficient and economic way. It is estimated that weldments produced account for up to 50% of the United States GNP--including almost everything we use in our daily life, from coffee pots to nuclear reactors.

AWS is a technical standards producing organization with worldwide recognition. A system based on the American National Standards Institute (ANSI) "Procedures for the Development and Coordination of American National Standards" is used by AWS. These methods have been used to develop accepted standards for the training and certification of Welding Inspector and Welding Educator presently in use.

The American Welding Society submitted a proposal to the U.S. Department of Education to develop voluntary skill standards and certification for "Entry-Level" Welders. Subsequently, AWS proposed to the U.S. Department of Education to develop two additional levels of standards and certification, one for Welder Level II and Welder Level III.

An Education Grant Committee was formed to guide and implement both projects. The Committee members represented the following (refer to the appendix for a list of the members):

- Business Community - employers of welders such as fabricators, shipbuilders, aerospace
- Trade Unions - pipefitters, boilermakers, automotive
- Educators - vocational training instructors, post-secondary, college faculty
- Technical Community - welding engineers, designers, researchers, manufacturers of welding equipment and products.

The Education Grant Committee (EGC) first met on August 12, 1993 and met frequently during the projects.

SUMMATIVE EVALUATION PLAN

The summative evaluation was conducted by an independent evaluator, Dr. Joyce L. Winterton, through Winterton Associates. The evaluation assessed the effectiveness of the results of the standards development grant and its relevance and usefulness for both industry and education. Dr. Winterton has extensive experience working with industry and education as well as evaluation of projects.

The summative evaluation included five basic areas:

1. The results of the standards project in relation to the objectives outlined in the proposal including any modifications and the reasons for them.

2. The level of involvement of industry and employee/labor representatives in the development and verification of the standards.

3. The acceptability of the standards and certification to industry and their perceptions that the standards can be used to assess incoming employees and be adopted for current workers.

4. The level of involvement of education representatives in the standards development process and the acceptability of the standards for developing programs, curriculum and determining the proficiency of advanced welders.

5. Unexpected findings or results that could be beneficial to other organizations developing standards and certification.

The Summative Evaluation included a survey of the Education Grant Committee and observation of the Committee process. A questionnaire was sent to a random sample of employers who responded to the AWS survey in the Fall of 1995 to determine a consensus of welder skills and competencies required for individuals seeking to continue the development of their welding skills. In addition, a survey was sent to respondents who received the Welder Level II and III documents. Responses from the survey cards mailed by AWS with the documents were also reviewed. Dr. Winterton provided recommendations on ways to improve the skill standards process and outcomes. The data was analyzed and utilized for the summative report.

The summative evaluation compared the results and impact of the project to the framework and principles provided by the U.S. Departments of Education and Labor. The framework includes seven phases:

1. Development and solidification of the coalition of all industry partners–industry members, labor organizations, worker representatives, educators, student welders and state and Federal governments into a project management structure which will guide development, testing and implementation of industry standards and certification;

2. Identification of broadly-based occupations within the industry for which standards generally do not apply at present;

3. Development and validation of skill standards within the industry for the identified occupations.

4. Identification of appropriate training delivery mechanisms and processes for approving and accrediting appropriate training providers which would enable existing workers and new entrants to develop the skills to meet the industry standard;

5. Development and validation of methodology to assess new entrants and existing members of the workforce who wish to demonstrate their mastery of the industry standards;

6. Establishment of certification arrangements for recognition of achievement of the skill standards that will be recognized by employers within the industry, by relevant state and Federal government bodies and by the vocational and higher education systems; and

7. Establishment of implementation and marketing strategies to ensure:

    a. the adoption and utilization of the industry standards and certification at the individual employer, state, local and community college level;

    b. that processes are in place for the continuation of the project beyond the initial award to include all major non-baccalaureate degree occupations not covered in the initial pilot project and;

    c. that processes are in place to continuously update the industry-based occupational standards and to maintain the integrity of the skills assessment system and certifications processes.

The following principles were outlined to guide the standard projects' development:

1. Responsive to readily changing work organizations, technologies and market structures and based on broadly defined occupational categories within industries;

2. Benchmarked to world-class levels of industry performance and free from any gender, racial or other form of bias or discriminatory practice;

3. Based on a relatively simple structure to make the system readily understandable to users and tied to measurable, competency-based outcomes that can be readily assessed;

4. Developed cooperatively by all stakeholders and be comparable across industries, similar occupations and states;

5. Developed independently of any single training provider or type of training provider but applicable to a wide variety of education and training service providers, both work and school-based.

6. Useful for qualifying new hires and for continuously upgrading the skills of employees; and

7. Include basic reading, writing and critical thinking (i.e. SCANS-type) skills.

The AWS Skill Standards project was highly successful in completing the phases as outlined in the framework. The principles identified to guide the Skill Standards project were also adhered to as much as possible.

EVALUATION OF IMPLEMENTATION

Project Organization

The project was organized with specific timelines, major milestones, management plan, committee and staff responsibilities that have basicly stayed on target. The Education Grant Committee remained actively involved throughout the project. The project staff also attended meetings conducted by the U.S. Department of Education for all the standards projects:

Project Objective and Products

The overall objective of the American Welding Society project "Development of Standards and Certification for Welder Level II and Level III" was to operate a business/ labor/education technical committee which would propose national standards and skills certification system for competency in the welding industry. The project proposal outlined three products to be developed for each of the two additional welder competency levels (Welder II and Welder III):

- National Standards for Level II and III Welders
- Curriculum for Training Level II and III Welders
- Certification Program for Level II and III Welders

It was projected that these six products (three per Welder Level) would provide a standardized industrial-education methodology for the career training of welders and a process of certification to a National Standard that is representative of the voluntary consensus of business, labor and education. It was anticipated that the additional work would create a three-level system of Skill Standards that provides the individual with the following:

- Portability: Ability to move from one job to another and use a portable credential, the "Certification Card."
- Additive: The process starts in the classroom and continues to the workplace.
- Trust: The users, industry, and others have over the years learned to trust AWS certification and the Society has credence.

The process to develop the standards and certification included the following components:

- Determination of the competencies (data from the DACUM survey conducted for Welder Level I were utilized)
- Preparation of Standards
- Development of Curricula
- Preparation of Certification Information and Tests
- Development of Test Bank
- Certification System
- Development of Skill Update Methods
- Development and Maintenance of Skill and Certification Data Base
- Dissemination - Distribution

The AWS project identified the following benefits of developing the National Skill Standards and Certification:

- Provides a proven framework for generating valid and reliable Skill Standards, assessment and certification system.
- Establishes a set of common levels of qualification for career entry and progression within the welding workforce.
- Provides criteria and recognition procedures for other organizations interested in developing standards.
- Creates a procedure for disseminating Skill Standards for employers, education and training providers, assessment systems and most importantly - the individual.
- Presents a system that ensures easy access to the produced standards.
- Offers a "career path" to the candidate that allows for schooling and time in the workplace.

Summary

The AWS project "Development of Standards and Certification for Welder II and Level III" successfully utilized the business, labor and industry technical committee (Education Grant Committee) to develop the National Standards, Curriculum and Certification program as proposed. Overall the AWS project implemented the proposal as it was designed. The implementation plan was ambitious, but was achieved due to the previous experience of AWS with standards, the dedicated staff and the active involvement of the industry.

The standards and curriculum were disseminated to 10,000 schools and institutions (postsecondary, vocational training and adult education) and interested parties. The certification program is well on its way to full implementation. Use of the National Skill Standards is voluntary. Participating organizations may qualify and certify Level II - Advanced Welders and Level III - Expert Welders if they are registered as an AWS Participating Organization. Welder performance qualification tests are administered based on AWS guidelines and are conducted at AWS Accredited Test Facilities. For each successful Level II and Level III Welders, the participating organizations prepare a report on the results of the written examination, the safety portion of the written examination, and the performance qualification tests. The participating organization sends the report to AWS at which time the data is entered into the Level II or Level III Welder databases. The databases serve as the National Registry for Level II - Advanced and Level III - Expert Welders. The training curriculum provides a uniform implementation process. A site visit by AWS representatives can be used to monitor the compliance of the training and testing facilities.

EVALUATION OF PROJECT OUTCOMES

Project Outcomes

The Education Grant Committee (EGC) completed a survey at their April 20, 1996 meeting in Chicago, Illinois. The evaluation responses from the Education Grant Committee (EGC) agreed that the standards reflect the skills needed by Level II and III Welders and that certification would improve the skills of welders. They also strongly agreed that a person with the skills would be a good prospect for employment in the welding industry . However, the Committee was less optimistic that educators would utilized the standards and certification. The EGC was also asked to rate the progress in meeting the project objectives. The following reflects the average response of the Committee members:

Objectives of the AWS Project

Rate the progress of the AWS Standards Project in meeting the following objectives on a scale of 1 to 5 (5 very effectively met the objective, 3 met the objective and 1 did not meet the objective).

4.5 1. Determining the competencies for level II and III welders".

4.2 2. Validated industry standards for level II and III welder competency standards.

4.4 3. Preparing certification requirements and tests.

4.0 4. Developing students' curriculum.

3.4 5. Development of test bank.

The Education Grant Committee members were also asked to rate the importance of the outcomes projected by the AWS project. The average responses are indicated below:

Outcomes of the AWS Standards and Certification

Rate the importance of the outcomes of the AWS Skill Standards (1 being most important and 5 being least):

2.0 Commitment from major user groups (industry & education) that they accept and will support the standards.

2.1 Verification of potential employees abilities.

2.2 The standards are easy to understand.

2.3 The standards are developed, produced and disseminated.

2.3 Establish training curriculum.

2.4 Help with instructor development and certification.

Summary

The summary of the evaluation instrument is included in the Appendix. Overall the responses from the Grant Committee members were positive about the project, its progress, the projected outcomes and the potential impact of the project. One committee member stated, " There has been an excellent exchange of ideas between the various industries and schools related to welder training and certification. The AWS project provided a product that has been required by industry and education for many years."

EVALUATION OF PROJECT IMPACT

Summative Evaluation Survey Results

Summative evaluation instruments were mailed to a random sample of 100 employers who had responded in the fall of 1995 to the AWS survey designed to determine the competencies required for welders seeking to continue the development of their welding skills. The response rate for the employer survey was 44%. A second evaluation instrument was sent to a random sample of 100 educators who received the "American Welding Society Information Kit for Level II and Level III Welders". The response rate for the educators survey was 23%. The mailings were sent on August 30, 1996. The survey instruments included 15 to 18 questions that dealt with the potential impact of the Level II and Level III Welder Standards and Certification.

Potential Impact

Employer Survey Results

Based on the employer mail survey, the majority of respondents agree (mean response of 4.0 to 5.0) that the standards project did have potential for a positive impact in the following areas:

- Improving the communications between industry and education or training.
- Improving the skills of welders moving from entry level to advanced levels.
- Encouraging employers to hire a welder who is certified for Level II or III.
- Providing a tool for education and training organizations to judge their welding programs.

The survey respondents also agreed to the following statements, but not unanimously (mean response of 3.0 to 3.9):

- The is a need for national standards and certification of advanced welders.
- The survey process used by AWS will identify the skills and knowledge required for Level II and III Welders.
- The standards will offer a benchmark for employers.
- The standards should be revised every 5 years.
- The standards and certification will improve the respect for advanced and master welders
- Implementing the standards and certification will challenge and motivate welders who want to advance their skills.

- The standards and certification will help provide uniform training for welders.
- The standards and certification will provide industry with a better technically prepared advanced welder.
- Employers will have a universal measure for the skills of welders.
- The development of national voluntary skill standards/certification is a beneficial effort.
- AWS has provided a valuable role in developing standards and certification for advanced welders.

Educators Survey Results

Based on the educators mail survey, the majority of respondents agree (mean response of 4.0 to 5.0) that the standards project did have potential for a positive impact in the following areas:

- Improving communication between industry and education or training.
- Improving the skills of welders moving from entry level to advanced levels.
- Improving the respect for advanced and master welders.
- Improving the quality of education programs for advanced welders through use of the training curriculum.
- Encouraging welders to advance their skills.
- Promoting a better understanding of the importance of welding in industry.
- Upgrading the skills of instructors.
- Improving the uniformity of training for welders.
- Providing industry with a better technically prepared advanced welder.
- Providing education and training organizations a tool with which to judge their welding programs.
- Providing employers with a universal measure for the skills of welders.

The education respondents also agreed to the following:

- The standards are easy to understand.
- The standards identify the skills and knowledge required for Level II and III welders.
- It is important to have standards and verification for Level II and III welders.
- The standards should be revised every 5 years.
- My organization will utilize the standards and certification.
- The development of national voluntary skill standards/certification is a beneficial effort.
- It is worthwhile to commit to School Excellence Through National Standards Education (SENSE).

A response card was mailed by AWS with the information kit for Level II and Level III welders. The initial responses reinforced the positive attitude of educators towards the standards. Based on the first 48 returned cards, 90% of the respondents said they anticipated using the Level II and Level III welders materials. The majority also agreed (98%) that they would use a workbook developed to support the AWS welding handbook.

Summary

Based on the review of the materials and feedback from industry and education the AWS project has been well worth the investment. Even though it was one of the more ambitious of the standards project, it has met and at times exceeded the proposed plan. The impact of the Level II - Advanced Welders and Level III - Expert Welders, as perceived by the Education Grant Committee, employers and education organizations, will be substantial. The expected benefits will likely be achieved. The evaluator commends AWS for their foresight and for the quality of the work completed.

CONCLUSIONS

1. The project was soundly supported by industry and education.
2. The AWS project met the objective and achieved the outcomes outlined in the proposal.
3. The project was well managed and implemented.
4. The project utilized a proven process that can be used as a model for standards and certification development.
5. A broad dissemination plan to schools and institutions was implemented.
6. The National Registry established for Level II - Advanced Welders and Level III - Expert Welders can assist employers in hiring skilled welders. It will also benefit employees in marketing their welding skills.
7. The standards and certification assist in providing a "career path" for welders who want to improve their skills and advance in their employment.

RECOMMENDATIONS

1. The process used by AWS for developing the standards and certification for Level II and III Welders should be used as a model for other standards projects.
2. AWS should provide information on the results and benefit of maintaining a National Registry of certified advanced and expert welders to interested organizations.
3. AWS should work with industry to evaluate and document the success of the certification program in providing highly skilled, productive advanced and expert welders. If such documentation is possible, the employers in the industry should be encouraged to reflect this success in increased salaries.
4. The standards and certification should be revised every 5 years as recommended by representatives of industry and education to keep it current with changing technology.
5. The American Welding Society should continue to implement strategies to inform industry and education about the national standards and certification and how to utilize them.
6. The AWS standards and certifications provide a framework that can be used to articulate secondary, postsecondary and industry welding programs.

APPENDIX

AWS EDUCATION GRANT COMMITTEE

F.G. Delaurier, Chairman	American Welding Society
N.C. Wall, Vice Chairman	American Welding Society
R.V. Reeve, Secretary	American Welding Society
R.L. O'Brien, Program Manager	American Welding Society
J. Bartley	Consulting Engineer
E.R. Bohnart	Miller Electric Mfg. Co.
S.W. Bollinger	The Esab Group, Inc.
F. Cusma	Pacific North west Ironworkers
J.E. Greer	Moraine Valley Community College
J.H. Ivy	Ingalls Shipbuilding
L.G. Kvidahl	Ingalls Shipbuilding
R. Murray	H & M Steel, Inc.
L.W. Myers	Dresser-Rand, Inc.
A. L. Petroski	Valmet, Inc. Honeycomb Division
R. C. Pierce	Welding Engineering Supply Co.
S.L. Raymond	National Training Fund
R. J. Teuscher	AWS Precision Joining Center
D. Howden, Ex-Officio	American Welding Society
J.C. Papritan, Ex-Officio	Ohio State University
C.E. Pepper, Ex-Officio	U.S. Department of Energy

SUMMARY OF EDUCATION GRANT COMMITTEE RESPONSES

EDUCATION GRANT COMMITTEE

Skill Standard and Certification for Welders
Level II and III

SUMMATIVE EVALUATION

Please respond to the following statements by circling the appropriate answer and filling in the blank where requested.

A. Development of the Standards and Certification

	Disagree		Agree		Strongly Agree
1. I am satisfied with the results of the project thus far. (4.3)	0	0	4	3	9
2. The standards will have broad acceptance by industry. (3.6)	0	2	5	6	3
3. I agree with the process used to develop the standards and certification. (4.6)	0	0	1	5	10
4. The process involved a broad scope of the industry. (4.6)	0	0	2	3	11
5. The process involves an (4.4) appropriate dissemination plan.	0	0	1	8	7
6. The skills are representative of those needed by level II and III welders. (4.1)	0	0	2	8	4
7. Certification will improve the skills of level II and III welders. (4.3)	0	0	0	10	5
8. I would consider a person with these skills as a good prospect for employment in industry. (4.7)	0	0	0	5	11
9. Educators will utilized the standards and certification. (3.4)	0	3	6	5	2
10. The process used by AWS for the development of standards and certification could be used by other industries. (4.4)	0	0	3	3	10

B. Objectives of the AWS Project

Rate the progress of the AWS Standards Project in meeting the following objectives on a scale of 1 to 5 (5 very effectively met the objective, 3 met the objective and 1 did not meet the objective).

4.5 1. Determining the competencies for level II and II welders".

4.2 2. Validated industry standards for level II and II welder competency standards.

4.4 3. Preparing certification requirements and tests.

4.0 4. Developing students' curriculum.

3.4 5. Development of test bank.

C. Outcomes of the AWS Standards and Certification

Rate the importance of the outcomes of the AWS Skill Standards (1 being most important and 5 being least):

2.3 The standards are developed, produced and disseminated.

2.0 Commitment from major user groups (industry & education) that they accept and will support the standards.

2.2 The standards are easy to understand.

2.1 Verification of potential employees abilities.

2.3 Establish training curriculum.

2.4 Help with instructor development and certification.

___ Other (please list):

EDUCATION GRANT COMMITTEE

Skill Standard and Certification for Welders
Level II and III

SUMMATIVE EVALUATION

Positive Comments:

"Keep up the Good work"

"Excellent exchange of ideas between the various industries and schools related to welder training and certification. Provided a product that has been required by industry and education for many years"

"Very Organized"

"Program was carried out very expeditiously and in a businesslike manner. A big step forward for the welding industry"

"The process used was excellent"

"It was a very positive personal experience. This work will be incorporated into our present training and upgrading program for Journeymen welders"

"The group was extremely diverse and came from many different areas. This meant that there was a very diverse group, with many ideas. These differences were resolved extremely well. They came up with a better standard because of this diversity"

"Well pleased with being a part of both grants, and seeing the input that all members and AWS staff have shown. Everyone openly expressed their ideas / concerns and yet helped to develop the document. I think that schools who teach carefully and completely will prepare students who will be employable"

"Will help schools across the U.S. It will up-grade instructors and students"

"As an Aerospace representative, I feel the project results were outstanding. As time goes on, other industries will implement these standards"

Suggestions for Improvement:

"It is expensive and somewhat inflexible. Skills in this program are not uniform through the industry"

"I have felt that we are expecting too much in all areas, and that we may have to allow specialization sometime in the future"

"Timing was very tight. Need to receive the more complex information 1 month prior to meeting for proper review and networking"

"Need feedback from schools on effectiveness of program training curriculum. Need feedback from industry on acceptance or improvement of skills in welders. Need evaluation/confirmation on cost savings in industry, either by reduced testing, a shorter learning curve or less in-house training of new hires for graduates of Welder II or III programs"

"Perhaps representatives from the public education sector"

"Sell Administrators within the schools on the program. This would probably have to take place through the U.S. Department of Education"

Other:

"In retrospect - there is much more information/requirements in Level I than would have been, had we known that 3 levels would be developed at the very beginning, i.e. Level I is heavy and Level III is very sparse"

"Can you get information from this school on GTAW processes with the material of nickel, copper, magnesium and titanium? What do they think of this? Can they get it or will they have to pay for it from the industry? Will or can they use GMAW-P?"

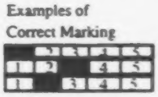
"I have worked with many groups, but none quite so diverse. The idea sharing and cooperation was impressive"

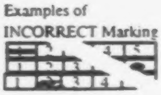
EMPLOYERS SURVEY

Winterton & Associates

Survey Form: **AWS Survey for Level II and III Welders Skill Standards & Certification - Employers**
Survey Date: **August 30, 1996**

Instructions: Please complete this form completely (both sides, if applicable). Be sure to use only a number 2 pencil or black ink pen. Complete the box in the upper right corner of this form (as instructed).


Examples of Correct Marking


Examples of INCORRECT Marking

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8	8	8	8	8	8	8	8	8	8
9	9	9	9	9	9	9	9	9	9

		Strongly Disagree	Disagree	Somewhat Agree	Agree	Strongly Agree
1.	**There is a need for national standards and certification of advanced welders.**	☐	☐	☐	☐	☐
2.	**The survey process used by AWS will identify the skills and knowledge required for Level II and III welders.**	☐	☐	☐	☐	☐
3.	**The standards will improve the communications between industry and education or training.**	☐	☐	☐	☐	☐
4.	**The standards will help to improve the skills of welders moving from entry level to advanced levels.**	☐	☐	☐	☐	☐
5.	**I would prefer to hire a welder who is certified for Level II or III.**	☐	☐	☐	☐	☐
6.	**The standards will offer a benchmark for employers.**	☐	☐	☐	☐	☐
7.	**The standards should be revised every 5 years.**	☐	☐	☐	☐	☐
8.	**The standards and certification will improve the respect of advanced and master welders.**	☐	☐	☐	☐	☐
9.	**Implementing the standards and certification will challenge and motivate welders who want to advance their skills.**	☐	☐	☐	☐	☐
10.	**The standards and certification will help provide uniform training for welders.**	☐	☐	☐	☐	☐
11.	**The standards and certification will provide industry with a better technically prepared advanced welder.**	☐	☐	☐	☐	☐
12.	**Education and training organizations will have a tool to judge their welding programs.**	☐	☐	☐	☐	☐
13.	**Employers will have a universal measure for the skills of welders.**	☐	☐	☐	☐	☐
14.	**The development of national voluntary skill standards/certification is a beneficial effort.**	☐	☐	☐	☐	☐
15.	**AWS has provided a valuable role in developing standards and certification for advanced welders.**	☐	☐	☐	☐	☐
		☐	☐	☐	☐	☐
		☐	☐	☐	☐	☐
		☐	☐	☐	☐	☐
		☐	☐	☐	☐	☐
		☐	☐	☐	☐	☐
		☐	☐	☐	☐	☐
		☐	☐	☐	☐	☐

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Positive Comments:

Suggestions:

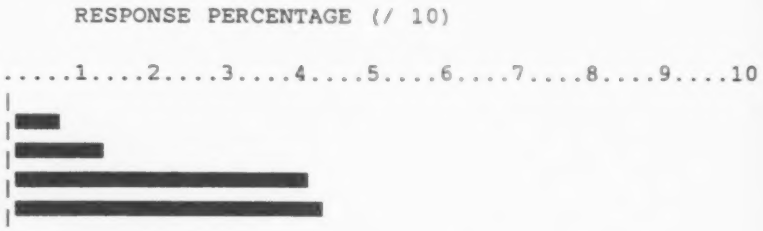
Name (optional): ______________________ **State** ____________

Type of Company or School: ______________________________

Name of Company or School (optional): __________________________

Welders Skill Standards & Certification

QUESTION 1: Need for nat'l standards/cert. of adv. welders.

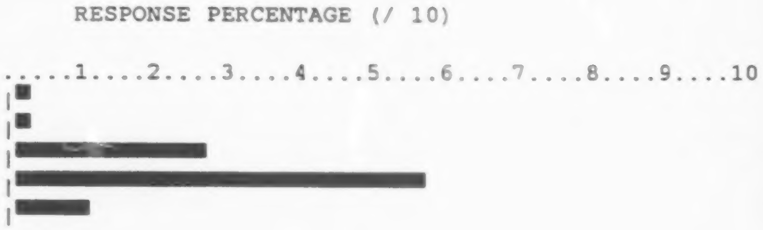


```
       Response                       %

  1 Strongly Disagree               0.0
  2 Disagree                        7.0
  3 Somewhat Agree                 11.6
  4 Agree                          39.5
  5 Strongly Agree                 41.9

Total respondents =     43        Mean =  4.16          Std. Dev. =  0.89
  Non-respondents =      0     Non-respondents as % of total forms =  0.00
```

QUESTION 2: Process identifies skills/know. for Level II/III.

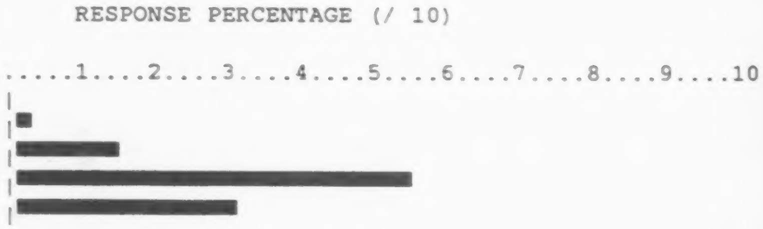


```
       Response                       %

  1 Strongly Disagree               2.3
  2 Disagree                        2.3
  3 Somewhat Agree                 27.3
  4 Agree                          56.8
  5 Strongly Agree                 11.4

Total respondents =     44        Mean =  3.73          Std. Dev. =  0.78
  Non-respondents =      0     Non-respondents as % of total forms =  0.00
```

QUESTION 3: Standards will improve comm. bet. industry/ed.



```
       Response                       %

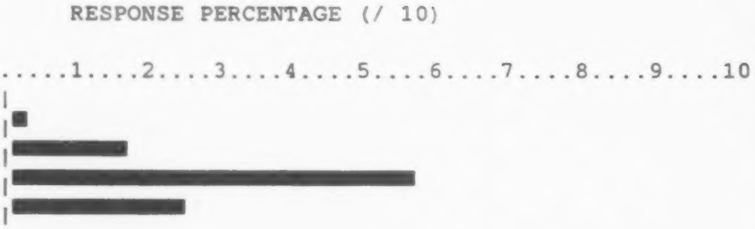
  1 Strongly Disagree               0.0
  2 Disagree                        2.3
  3 Somewhat Agree                 13.6
  4 Agree                          54.5
  5 Strongly Agree                 29.5

Total respondents =     44        Mean =  4.11          Std. Dev. =  0.71
  Non-respondents =      0     Non-respondents as % of total forms =  0.00
```

Welders Skill Standards & Certification

QUESTION 4: Standards will help to improve the skills.

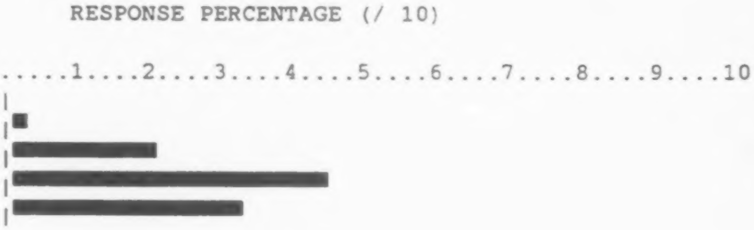
Response	%
1 Strongly Disagree	0.0
2 Disagree	2.3
3 Somewhat Agree	15.9
4 Agree	56.8
5 Strongly Agree	25.0



Total respondents = 44 Mean = 4.05 Std. Dev. = 0.71
Non-respondents = 0 Non-respondents as % of total forms = 0.00

QUESTION 5: I prefer to hire a welder Level III or III cert.

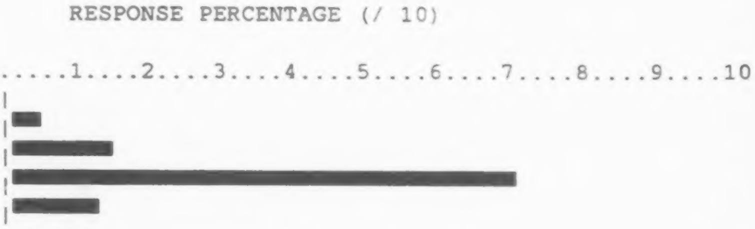
Response	%
1 Strongly Disagree	0.0
2 Disagree	2.3
3 Somewhat Agree	20.9
4 Agree	44.2
5 Strongly Agree	32.6



Total respondents = 43 Mean = 4.07 Std. Dev. = 0.79
Non-respondents = 1 Non-respondents as % of total forms = 2.27

QUESTION 6: Standards offer a benchmark for employers.

Response	%
1 Strongly Disagree	0.0
2 Disagree	4.7
3 Somewhat Agree	14.0
4 Agree	69.8
5 Strongly Agree	11.6



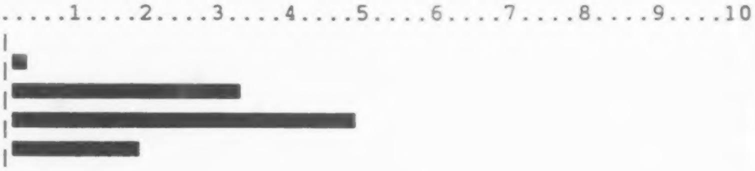
Total respondents = 43 Mean = 3.88 Std. Dev. = 0.65
Non-respondents = 1 Non-respondents as % of total forms = 2.27

Welders Skill Standards & Certification

```
QUESTION   7: Standards should be revised every 5 years.

                                      RESPONSE PERCENTAGE (/ 10)
      Response                  %
                                    .....1....2....3....4....5....6....7....8....9....10
  1 Strongly Disagree          0.0 |
  2 Disagree                   2.3 |
  3 Somewhat Agree            31.8 |
  4 Agree                     47.7 |
  5 Strongly Agree            18.2 |

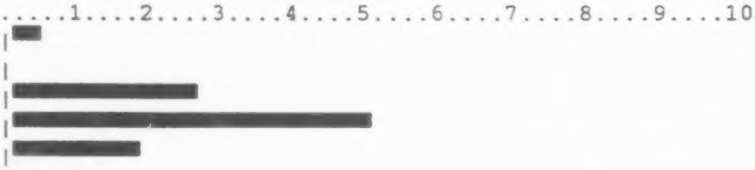
Total respondents =    44        Mean =  3.82          Std. Dev. =  0.75
  Non-respondents =     0    Non-respondents as % of total forms =  0.00
```



```
QUESTION   8: Stand/cert improves respect of Adv/Master welders.

                                      RESPONSE PERCENTAGE (/ 10)
      Response                  %
                                    .....1....2....3....4....5....6....7....8....9....10
  1 Strongly Disagree          4.5 |
  2 Disagree                   0.0 |
  3 Somewhat Agree            27.3 |
  4 Agree                     50.0 |
  5 Strongly Agree            18.2 |

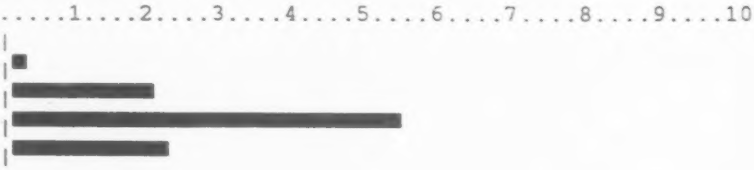
Total respondents =    44        Mean =  3.77          Std. Dev. =  0.90
  Non-respondents =     0    Non-respondents as % of total forms =  0.00
```



```
QUESTION   9: Will challenge/motivate welders to advance.

                                      RESPONSE PERCENTAGE (/ 10)
      Response                  %
                                    .....1....2....3....4....5....6....7....8....9....10
  1 Strongly Disagree          0.0 |
  2 Disagree                   2.3 |
  3 Somewhat Agree            20.5 |
  4 Agree                     54.5 |
  5 Strongly Agree            22.7 |

Total respondents =    44        Mean =  3.98          Std. Dev. =  0.72
  Non-respondents =     0    Non-respondents as % of total forms =  0.00
```

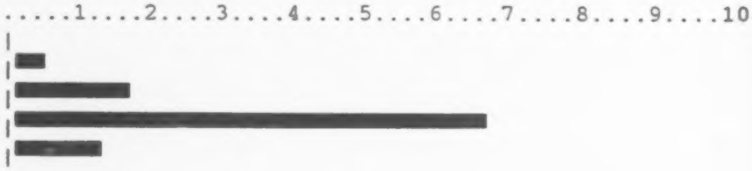


Welders Skill Standards & Certification

```
QUESTION  10: Stand/cert will provide uniform training.

                                              RESPONSE PERCENTAGE (/ 10)
       Response                     %
                                       .....1....2....3....4....5....6....7....8....9....10
  1 Strongly Disagree              0.0 |
  2 Disagree                       4.7 |
  3 Somewhat Agree                16.3 |
  4 Agree                         67.4 |
  5 Strongly Agree                11.6 |

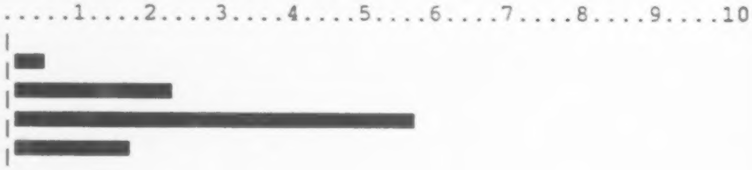
Total respondents =    43         Mean =  3.86         Std. Dev. =  0.67
  Non-respondents =     1     Non-respondents as % of total forms =  2.27
```



```
  ESTION  11: Provides industry w/better tech advanced welder.

                                              RESPONSE PERCENTAGE (/ 10)
       Response                     %
                                       .....1....2....3....4....5....6....7....8....9....10
  1 Strongly Disagree              0.0 |
  2 Disagree                       4.5 |
  3 Somewhat Agree                22.7 |
  4 Agree                         56.8 |
  5 Strongly Agree                15.9 |

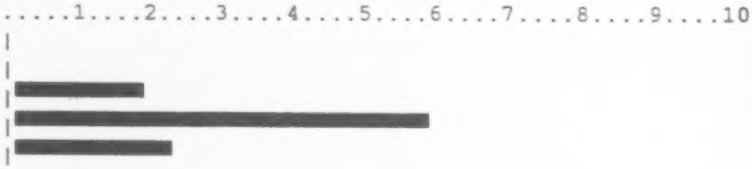
  tal respondents =    44         Mean =  3.84         Std. Dev. =  0.74
  Non-respondents =     0     Non-respondents as % of total forms =  0.00
```



```
QUESTION  12: Ed/Training orgs-tool to judge their programs.

                                              RESPONSE PERCENTAGE (/ 10)
       Response                     %
                                       .....1....2....3....4....5....6....7....8....9....10
  1 Strongly Disagree              0.0 |
  2 Disagree                       0.0 |
  3 Somewhat Agree                18.6 |
  4 Agree                         58.1 |
  5 Strongly Agree                23.3 |

Total respondents =    43         Mean =  4.05         Std. Dev. =  0.65
  Non-respondents =     0     Non-respondents as % of total forms =  0.00
```

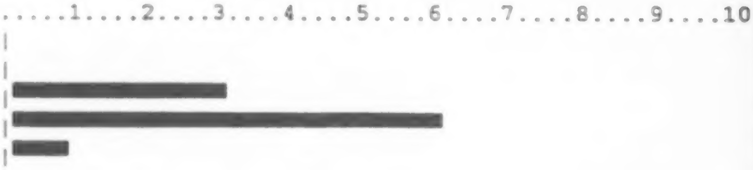


Welders Skill Standards & Certification

QUESTION 13: Universal measure for welders skills (Employers).

```
                                  RESPONSE PERCENTAGE (/ 10)
      Response              %
  1 Strongly Disagree      0.0
  2 Disagree               0.0
  3 Somewhat Agree        29.5
  4 Agree                 61.4
  5 Strongly Agree         9.1

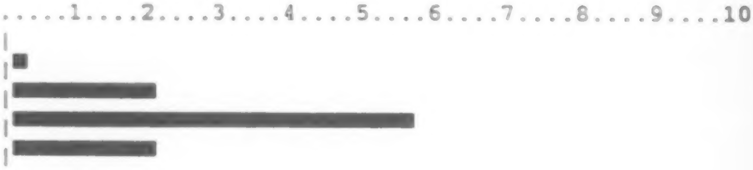
otal respondents =    44       Mean =  3.80          Std. Dev. =  0.59
 Non-respondents =     0     Non-respondents as % of total forms =  0.00
```



QUESTION 14: Development of nat'l stand/cert if beneficial.

```
                                  RESPONSE PERCENTAGE (/ 10)
      Response              %
  1 Strongly Disagree      0.0
  2 Disagree               2.3
  3 Somewhat Agree        20.5
  4 Agree                 56.8
  5 Strongly Agree        20.5

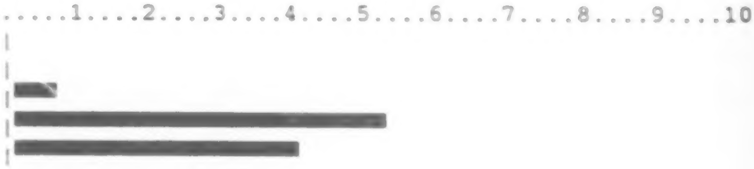
Total respondents =    44       Mean =  3.95          Std. Dev. =  0.71
 Non-respondents =     0     Non-respondents as % of total forms =  0.00
```



QUESTION 15: AWS provides valuable role in dev. stand/cert.

```
                                  RESPONSE PERCENTAGE (/ 10)
      Response              %
  1 Strongly Disagree      0.0
  2 Disagree               0.0
  3 Somewhat Agree         6.8
  4 Agree                 52.3
  5 Strongly Agree        40.9

Total respondents =    44       Mean =  4.34          Std. Dev. =  0.60
 Non-respondents =     0     Non-respondents as % of total forms =  0.00
```



Positive Comments:

- I think it's a great idea to make a standard for welders and wish you every success in your endeavors.
- I believe that these standards are definitely needed and will help a large portion of industry. Although I am not sure about the length of time that this will take to happen (to filter down to the manufacturer level).
- Questions 1, 5, 6, 7 and 13 have value; the rest are left to opinion and conjecture without basis.
- I feel that this is really a good program.
- I believe a standardized test will help me become a better welder by giving me a guideline of my skills. A test for certification would let me know what my strengths are and what I need to study to improve my weaknesses.
- Any benchmark to determine the skill and training of a welder is a benefit.
- Welding is an art—technical skills are one of the major aspects.
- Industry and technology have progressed to the level whereby there must be a standard or specification to evaluate performance.
- The AWS, the city county of Los Angeles and most employers all have the requirement to certify. This is good. But, if a welder could be certified under one code and be certified for other employers, the boilermakers have "comon arc" that the employers sign so if you certify with one, that has signed with "comon arc", you are certified with the other companies that signed with "comon arc." Thank you for your time.
- This endeavor by the AWS was long in coming, but it will benefit all in the welding trade as to getting the many individuals who make a living at this trade, the recognition they deserve. "Welding Holds our World Together."
- You are headed in the right direction! Keep going and good luck!
- A "benchmark" for employers and the insurance industry are the most positive results of these advancements. In the next five years, the influx of non-skilled welders and those welders that have been in the industry need these advancements to show their competency and knowledge that sets them apart from the lesser skilled welders.
- I sure would like the results of this survey. We have been trying to set up a welder qualification system where I work for a couple of years now and have not been too successful yet.
- I am a CWI and CWE—the AWS standards and codes are my guidelines. I think AWS is doing great in making companies more aware of the importance of codes and standards in welding. Codes are really starting to be enforced in my area. Being a certified welder also, I see the importance of AWS, the companies and contractors in our area, through codes and standards, are realizing you can't take anybody off the street and in a week or so claim he or she is a welder.
- I agree in context for this effort. However, I do feel many employers will be reluctant to support such a program. It needs to be pushed aggressively in the schools to where the next generation of welders will be setting the standard.
- These certifications will help to raise the level of recognition toward welders in the construction field.

- both this and the common arc program are great for ASME accredited, Union shops that hire out of the hall, but so far our company has not been able to utilize the benefits of the AWS programs. Granted, we are a small contractor (approx. 20 employees and 5 certified welders), but would like to use the AWS and its programs to our benefit. Please contact me if there is any guidance to be offered.

Suggestions:

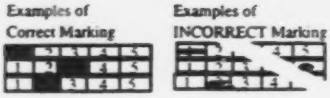
- The only problem I see in trying to accomplish a work like this is that with every company, there is so much difference in welding processes used. It makes it very hard to make a common standard that all could use.
- Offer an overview or consolidated outline of the results of your survey or program along with a questionnaire such as this one to get a true consensus or opinion from your sampling. These questions are being answered blindly.
- Teaching of logical thinking—problem solving and communication techniques would also benefit both employer and employee.
- Your efforts are appreciated by the manufacturing industry; continue on.
- We as a society, have to convince our educational institutions that the world will always require people who are proud of what they do for a living, and provide these individuals with the knowledge required by all our national industries to maintain our country as a world leader.
- Welding certifications should be retested on a yearly basis to maintain quality control. Because AWS can now maintain these records for welders and should be the testing facilities for the industry!
- That employers be notified of available certification programs.

EDUCATORS SURVEY

Winterton & Associates

Survey Form: **AWS Survey for Level II and III Welders Skill Standards & Certification - Educators**
Survey Date: **August 30, 1996**

Instructions: Please complete this form completely (both sides, if applicable). Be sure to use only a number 2 pencil or black ink pen. Complete the box in the upper right corner of this form (as instructed).



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5	5	5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8	8	8
9	9	9	9	9	9	9	9	9	9

	Strongly Disagree	**Disagree**	**Somewhat Agree**	**Agree**	**Strongly Agree**
1. The standards are easy to understand.	☐	☐	☐	☐	☐
2. The standards identify the skills and knowledge required for Level II and III welders.	☐	☐	☐	☐	☐
3. The standards will improve the communication between industry and education or training.	☐	☐	☐	☐	☐
4. The standards will improve the skills of welders moving from entry level to advanced levels.	☐	☐	☐	☐	☐
5. It is important to have standards and certification for Level II and III welders.	☐	☐	☐	☐	☐
6. The standards should be revised every 5 years.	☐	☐	☐	☐	☐
7. The standards and certification will improve the respect for advanced and master welders.	☐	☐	☐	☐	☐
8. The training curriculum will improve the quality of education programs for advanced welders.	☐	☐	☐	☐	☐
9. Through the standards and curriculum, welders will be encouraged to advance their skills.	☐	☐	☐	☐	☐
10. The standards and curriculum will promote a better understanding of the importance of welding in industry.	☐	☐	☐	☐	☐
11. The standards and certification will upgrade the skills of instructors.	☐	☐	☐	☐	☐
12. The standards and certification will help improve the uniformity of training for welders.	☐	☐	☐	☐	☐
13. The standards and certification will provide industry with a better technically prepared advanced welder.	☐	☐	☐	☐	☐
14. Education and training organizations will have a tool with which to judge their welding programs.	☐	☐	☐	☐	☐
15. Employers will have a universal measure for the skills of welders.	☐	☐	☐	☐	☐
16. My organization will utilize the standards and certification.	☐	☐	☐	☐	☐
17. The development of national voluntary skill standards/certification is a beneficial effort.	☐	☐	☐	☐	☐
18. It is worthwhile to commit to School Excellence Through National Standards Education (SENSE).	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐
	☐	☐	☐	☐	☐

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Positive Comments:

Suggestions:

Name (optional): ______________________ **State** __________

Type of Company or School: ______________________________

Name of Company or School (optional): __________________________

```
HISTOGRAM REPORT                                            SURVEY: WELDER18   PAGE: 1

                         Welders Skill Standards & Certification

QUESTION   1: Standards are easy to understand.

                                             RESPONSE PERCENTAGE (/ 10)
       Response                       %
                                        .....1....2....3....4....5....6....7....8....9....10
  1 Strongly Disagree                4.3 |██
  2 Disagree                         0.0 |
  3 Somewhat Agree                   8.7 |████
  4 Agree                           60.9 |██████████████████████████████
  5 Strongly Agree                  26.1 |█████████████

Total respondents =    23        Mean =  4.04           Std. Dev. =  0.86
  Non-respondents =     0     Non-respondents as % of total forms =  0.00

QUESTION   2: Standards identify Level II/III skills/knowledge.

                                             RESPONSE PERCENTAGE (/ 10)
       Response                       %
                                        .....1....2....3....4....5....6....7....8....9....10
  1 Strongly Disagree                4.5 |██
  2 Disagree                         0.0 |
  3 Somewhat Agree                   9.1 |████
  4 Agree                           59.1 |█████████████████████████████
  5 Strongly Agree                  27.3 |█████████████

Total respondents =    22        Mean =  4.05           Std. Dev. =  0.88
  Non-respondents =     1     Non-respondents as % of total forms =  4.35

QUESTION   3: Standards will improve comm. bet. industry/ed.

                                             RESPONSE PERCENTAGE (/ 10)
       Response                       %
                                        .....1....2....3....4....5....6....7....8....9....10
  1 Strongly Disagree                4.3 |██
  2 Disagree                         0.0 |
  3 Somewhat Agree                   8.7 |████
  4 Agree                           47.8 |████████████████████████
  5 Strongly Agree                  39.1 |███████████████████

Total respondents =    23        Mean =  4.17           Std. Dev. =  0.92
  Non-respondents =     0     Non-respondents as % of total forms =  0.00
```

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                         Welders Skill Standards & Certification

QUESTION   4: Standards will improve the skills for advancement.

                                                RESPONSE PERCENTAGE (/ 10)
      Response                         %
                                          .....1....2....3....4....5....6....7....8....9....10
  1 Strongly Disagree                0.0 |
  2 Disagree                         0.0 |
  3 Somewhat Agree                  13.0 |██████
  4 Agree                           39.1 |██████████████████
  5 Strongly Agree                  47.8 |███████████████████████

otal respondents =    23         Mean =  4.35          Std. Dev. =  0.70
 Non-respondents =     0     Non-respondents as % of total forms =  0.00

QUESTION   5: Important to have stand/cert for Level II/III.

                                                RESPONSE PERCENTAGE (/ 10)
      Response                         %
                                          .....1....2....3....4....5....6....7....8....9....10
  1 Strongly Disagree                0.0 |
  2 Disagree                         0.0 |
  3 Somewhat Agree                   8.7 |████
  4 Agree                           43.5 |████████████████████
  5 Strongly Agree                  47.8 |███████████████████████

otal respondents =    23         Mean =  4.39          Std. Dev. =  0.64
 Non-respondents =     0     Non-respondents as % of total forms =  0.00

QUESTION   6: Standards should be revised every 5 years.

                                                RESPONSE PERCENTAGE (/ 10)
      Response                         %
                                          .....1....2....3....4....5....6....7....8....9....10
  1 Strongly Disagree                0.0 |
  2 Disagree                         0.0 |
  3 Somewhat Agree                  39.1 |██████████████████
  4 Agree                           21.7 |██████████
  5 Strongly Agree                  39.1 |██████████████████

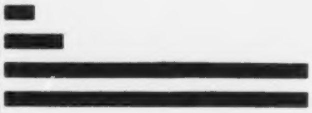
TOtal respondents =    23         Mean =  4.00          Std. Dev. =  0.88
  Non-respondents =     0     Non-respondents as % of total forms =  0.00
```

```
                     Welders Skill Standards & Certification

QUESTION   7: Stand/cert improves respect for adv/master welders

                                         RESPONSE PERCENTAGE (/ 10)
      Response                    %
                                    .....1....2....3....4....5....6....7....8....9....10
  1 Strongly Disagree            0.0 |
  2 Disagree                     4.3 |
  3 Somewhat Agree               8.7 |
  4 Agree                       43.5 |
  5 Strongly Agree              43.5 |

Total respondents =     23        Mean =  4.26         Std. Dev. =  0.79
  Non-respondents =      0    Non-respondents as % of total forms =  0.00
```



```
QUESTION   8: Curr. improves quality of ed program.

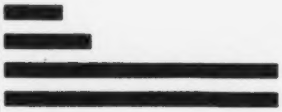
                                         RESPONSE PERCENTAGE (/ 10)
      Response                    %
                                    .....1....2....3....4....5....6....7....8....9....10
  1 Strongly Disagree            0.0 |
  2 Disagree                     4.3 |
  3 Somewhat Agree               8.7 |
  4 Agree                       39.1 |
  5 Strongly Agree              47.8 |

Total respondents =     23        Mean =  4.30         Std. Dev. =  0.80
  Non-respondents =      0    Non-respondents as % of total forms =  0.00
```

```
QUESTION   9: Welders will be encouraged to advance skills.

                                         RESPONSE PERCENTAGE (/ 10)
      Response                    %
                                    .....1....2....3....4....5....6....7....8....9....10
  1 Strongly Disagree            0.0 |
  2 Disagree                     8.7 |
  3 Somewhat Agree              13.0 |
  4 Agree                       39.1 |
  5 Strongly Agree              39.1 |

Total respondents =     23        Mean =  4.09         Std. Dev. =  0.93
  Non-respondents =      0    Non-respondents as % of total forms =  0.00
```



```
QUESTION  10: Promotes better understanding of imp. of welding.

                                           RESPONSE PERCENTAGE (/ 10)
       Response                   %
                                   .....1....2....3....4....5....6....7....8....9....10
  1 Strongly Disagree           0.0 |
  2 Disagree                    0.0 |
  3 Somewhat Agree             21.7 |
  4 Agree                      34.8 |
  5 Strongly Agree             43.5 |

Total respondents =    23        Mean =  4.22         Std. Dev. =  0.78
  Non-respondents =     0     Non-respondents as % of total forms =  0.00

QUESTION  11: Stand/cert upgrades skills of instructors.

                                           RESPONSE PERCENTAGE (/ 10)
       Response                   %
                                   .....1....2....3....4....5....6....7....8....9....10
  1 Strongly Disagree           0.0 |
  2 Disagree                    0.0 |
  3 Somewhat Agree             30.4 |
  4 Agree                      39.1 |
  5 Strongly Agree             30.4 |

 otal respondents =    23        Mean =  4.00         Std. Dev. =  0.78
  Non-respondents =     0     Non-respondents as % of total forms =  0.00

QUESTION  12: Stand/cert improves uniformity of training.

                                           RESPONSE PERCENTAGE (/ 10)
       Response                   %
                                   .....1....2....3....4....5....6....7....8....9....10
  1 Strongly Disagree           0.0 |
  2 Disagree                    0.0 |
  3 Somewhat Agree              8.7 |
  4 Agree                      30.4 |
  5 Strongly Agree             60.9 |

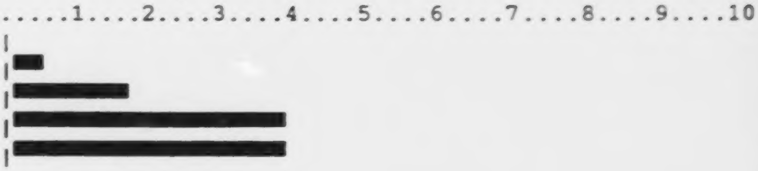
Total respondents =    23        Mean =  4.52         Std. Dev. =  0.65
  Non-respondents =     0     Non-respondents as % of total forms =  0.00
```

Welders Skill Standards & Certification

QUESTION 13: Provides industry w/tech prepared welder.

RESPONSE PERCENTAGE (/ 10)

Response	%
1 Strongly Disagree	0.0
2 Disagree	4.3
3 Somewhat Agree	17.4
4 Agree	39.1
5 Strongly Agree	39.1

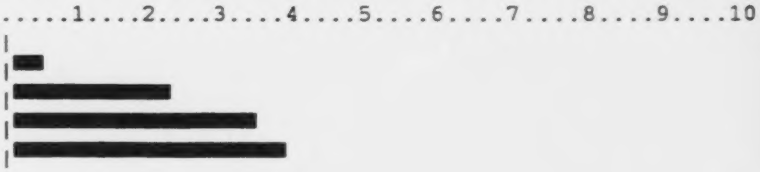


Total respondents = 23 Mean = 4.13 Std. Dev. = 0.85
Non-respondents = 0 Non-respondents as % of total forms = 0.00

QUESTION 14: Ed/trng orgs-tool to judge welding programs.

RESPONSE PERCENTAGE (/ 10)

Response	%
1 Strongly Disagree	0.0
2 Disagree	4.3
3 Somewhat Agree	21.7
4 Agree	34.8
5 Strongly Agree	39.1

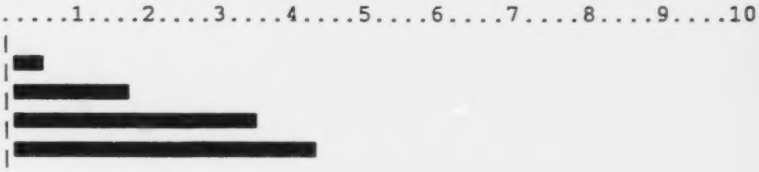


Total respondents = 23 Mean = 4.09 Std. Dev. = 0.88
Non-respondents = 0 Non-respondents as % of total forms = 0.00

QUESTION 15: Employers will have universal measure for welders

RESPONSE PERCENTAGE (/ 10)

Response	%
1 Strongly Disagree	0.0
2 Disagree	4.3
3 Somewhat Agree	17.4
4 Agree	34.8
5 Strongly Agree	43.5



Total respondents = 23 Mean = 4.17 Std. Dev. = 0.87
Non-respondents = 0 Non-respondents as % of total forms = 0.00

```
                     Welders Skill Standards & Certification

QUESTION  16: My org will utilize stand/cert.

                                         RESPONSE PERCENTAGE (/ 10)
      Response                      %
                                      .....1....2....3....4....5....6....7....8....9....10
  1 Strongly Disagree              0.0 |
  2 Disagree                       4.3 |
  3 Somewhat Agree                 8.7 |
  4 Agree                         47.8 |
  5 Strongly Agree                39.1 |

Total respondents =     23        Mean =  4.22          Std. Dev. =  0.78
  Non-respondents =      0     Non-respondents as % of total forms =  0.00


QUESTION  17: Dev. of skill stand/cert is beneficial.

                                         RESPONSE PERCENTAGE (/ 10)
      Response                      %
                                      .....1....2....3....4....5....6....7....8....9....10
  1 Strongly Disagree              0.0 |
  2 Disagree                       0.0 |
  3 Somewhat Agree                13.0 |
  4 Agree                         26.1 |
  5 Strongly Agree                60.9 |

Total respondents =     23        Mean =  4.48          Std. Dev. =  0.71
  Non-respondents =      0     Non-respondents as % of total forms =  0.00


QUESTION  18: Worthwhile to commit to SENSE.

                                         RESPONSE PERCENTAGE (/ 10)
      Response                      %
                                      .....1....2....3....4....5....6....7....8....9....10
  1 Strongly Disagree              0.0 |
  2 Disagree                       9.1 |
  3 Somewhat Agree                13.6 |
  4 Agree                         27.3 |
  5 Strongly Agree                50.0 |

Total respondents =     22        Mean =  4.18          Std. Dev. =  0.98
  Non-respondents =      1     Non-respondents as % of total forms =  4.35
```

Positive Comments:

- None, well written.
- My feeling is this can be a great asset to our programs.
- Industry and education need this connection for proof of training from education to industry. I have not received Level III, would like to.
- As a welder with 35 years in the trade and 6 years as an instructor, we feel that this program is long overdue! The AWS Syracuse, NY section is working very hard to implement the entry level welder program in the area schools. My problem is my school has accepted the standards, but will not allow us the time to do it. Re: 910 hours per course vs AWS standards are 1300 hours.
- This is a very worthwhile program. It should be used throughout the U.S. by both schools and industry.
- The state of Idaho Welding Instructors, both secondary and post-secondary have just adopted the Level I as official state curriculum. This will help in articulation of high schools and college programs, plus it will allow for a uniform number system which will allow for transfer within the state. Perhaps we could do this on a national level?
- We are currently using the entry level standards and curriculum guide and when used with Hobarts programmed audio visual training system, we believe it to be the best instructional package available. I have reviewed the standards and curriculum guide for Level II and III welders. I find them to be of the same excellent quality as the entry level program. Unfortunately, being a secondary school with time limitations we will probably not reach this level.
- Gives a standard to teach to plus skill and written tests.
- It's about time education and industry work towards a common goal! It is 1996, and we are part of a world market!
- A real plus for training institutions, with the cooperation with industry.
- We are on the entry level I program and we love it. Level II and III should be used at the post secondary programs but we can't get them to use it.
- A review period of 5 years minimum will insure coverage for technical advances. I believe that basic process mastery is still the key to preparing students.

Suggestions:

- Who will employ Level II and III welders above $15/hr? No one. Who will employ them at $12/hr? No one. The standards and qualifications are for Certified Welding Inspectors or Engineers, not welders that I see everyday. The type of employer I deal with wants a qualified welder, not a CWI and will not pay the hourly rate graduates of Level II or III might expect.
- As of September 17, 1996, no information has been received. Only this survey. AWS never sent kit to me. If received after September 17, not enough time to review.
- Keep purchase price as low as possible, because budgets are not what they should be.
- Add some form of oxygen-fuel welding maybe in the Level I.
- We need people who can go to the top and suggest to the proper people the benefits and sell the plan. Money, money, money is the bottom line.

- A vocational welding instructor is certified by the State Dept of Ed in the state that he teaches. The AWS should take that into consideration and give him credit (in other words, give him accreditation for that).
- This is my first year for using AWS Welder I. I teach in an area center and only have students 3 hours per day for two years—this means that a student that attends class every day will only get about 1000 hours of instruction. I don't know if I can get everything finished with high school students in this amount of time.
- Being an instructor at the community college level, we are still having problems with education requiring higher math skills than are actually needed for entry level as outlined in the AWS curriculum. I would love to elaborate if you are interested!
- Keep up the good work!
- A vehicle that would allow educational institutions an easier path to performing AWS certified testing.

Alabama =11
Alaska =2
Arizona =1
Arkansas =0
California =8
Colorado =3
Connecticut =0
Delware =0
District of Columbia =0
Florida =7
Georgia =4
Hawaii =0
Idaho =1
Illinois =3

Indiana =1
Iowa =1
Kansas =0
Kentucky =70
Louisiana =3
Maine =0
Maryland =2
Massachusetts =0
Michagan =2
Minnesota =1
Mississippi =1
Missouri =1
Montana =0
Nebraska =0
Nevada =1

New Hampshire =0
New Jersey =3
New Mexico =1
New York =3
N. Carolina =1
N. Dakota =0
Ohio =4
Oklahoma =4
Oregon =3
Pennsylvania =7
Rhode Island =0
S. Carolina =2
S. Dakota =0
Tennessee =1
Texas =3

Utah =1
Vermont =1
Virginia =2
Washington =4
W. Virginia =2
Wisconsin =3
Wyoming =0

Total: 169

The following by state order are the Participating Schools Excelling Through National Standards Education (S.E.N.S.E.):

STATE	PARTICIPATING ORGANIZATION
Alabama	Cleburne County Area Vocational School Route 2, Box 78A Heflin, AL 36264 **Contact:** Mr. Bill Ayers PH: (205)748-2961
	Dallas County Area Vocational School 1306 Roosevelt Ave. Selma, AL 36701 **Contact:** Mr. Sam Gladden PH: (334)872-8031 FAX: (334)872-2814
	Gardendale High School Welding Lab 800 Main Street Gardendale, AL 35071 **Contact:** Mr. Robin Thomas PH: (205)425-6172
	Gilmore-Bell Vocational High School 4933 Bessemer Johns Road Bessemer, AL 35023-3760 **Contact:** Mrs. Betty Steiner PH: (205)425-6172

STATE	PARTICIPATING ORGANIZATION
Alabama	Jefferson County Board of Education Dabbs Area Vocational Center 5191 Pine Whispers Drive Birmingham, AL 35210 **Contact:** Mr. William B. McGrady PH: (205)956-3968
	Metalworking Technology Minor High School 2285 Minor Parkway Adamsvukkem, AL 35005 **Contact:** Mr. Larry Headrick PH: (205)798-3770
	North Baldwin Center of Technology 1100 East 19th Street Jasper, AL 35501 **Contact:** Ms. Jewell B. Lawson PH: (334)937-6751 Fax: (334)937-4688
	Phenix City Board of Education Central High School 2400 Dobbs Drive Phenix City, AL 36867 **Contact:** Mr. George A. Martin PH: (334)298-3626 Fax: (334)298-7690
	Pinson Valley High School 6895 Highway 75 Pinson, AL 35126 **Contact:** Mr. Ronnie Puryear Mr. Dan Gettyan PH: (205)681-2640
	Tuscaloosa Center for Technology North 1300 37th Street East Tuscaloosa, AL 35405 **Contact:** Mr. Robert L. Roberts PH: (205)759-3648

STATE	PARTICIPATING ORGANIZATION
Alabama	Walker County Center of Technology 1100 East 19th Street Jasper, AL 35501 **Contact:** Mr. Mark Dutton PH: (205)387-0561
Alaska	Ilisagvik College, Mayor's Workplace Development Program Mayor's Workforce Development Programs P.O. Box 749 Barrow, AK 99723 **Contact:** Ms. Jennifer Chang Harty PH: (907)852-3333 Fax: (907)852-9102
	University of Alaska Anchorage Welding Technology 3211 Providence Drive Anchorage, AK 99508-8346 **Contact:** Mr. Gerald H. Park PH: (907)786-1184 Fax: (907)786-1180
Arizona	Central Arizona College 8470 N. Overfield College Coolidge, AZ 85228 **Contact:** Dr.John J. Klein PH: (520)426-4315 Fax: (520)426-4234
California	American River College 4700 College Oak Drive Sacramento, CA 95841 **Contact:** Mr. Howard Anderson Mr. Charles W. Stansell PH: (916)344-0261
	Central Santa Clara County Regional Occupation Agency/Programs 760 Hillsdale Ave. San Jose, CA 95136 **Contact:** Mr. Donald L. Wisuri PH: (408)723-6400 Fax: (408)266-6531

STATE	PARTICIPATING ORGANIZATION
California	Clovis West High School 1070 E. Teague Fresno,.CA 93720-1899 **Contact:** Mr. Jim Leatherwood PH: (209)322-1441
	Fullerton College 321 E. Chapman Ave. Fullerton, CA 92632-1318 **Contact:** Mr. Mike Burns PH: (714)992-7211 Fax: (714)992-7236
	North Orange County Regional Occupational Program 2360 W. La Palma Anaheim, CA 92801 **Contact:** Mr. Steve Heck PH: (714)776-2170 Fax: (714)776-3880
	Riverside Community College 4800 Magnolia Ave. Riverside, CA 92506-1299 **Contact:** Mr. Henry L. Jackson PH: (909)222-8279 Fax: (909)683-3230
	Riverside County Regional Occupational Program 3939 Thirteen Street Riverside, CA 92502-0868 **Contact:** Mr. Jim Leatherwood PH: (909)222-4412 Fax: (909)656-0145
	Shasta College 11555 Old Oregon Trail Redding, CA 96049-6006 **Contact:** Mrs. Francis Duchi PH: (916)225-4909

STATE	PARTICIPATING ORGANIZATION
Colorado	San Juan Basin Vo-Tech P.O. Box 999 Canon City, CO 81212 **Contact:** Mr. Ross Kibel PH: (719)269-5811
	Trades Place Vocational School P.O. Box 999 Canon City, CO 81212 **Contact:** Mr. Tony Rodasta PH: (719)269-5811
	Unified Technical Education Campus 2508 Blichmann Ave. Grand Junction, CO 81505 **Contact:** Mr. Kerry Youngblood PH: (970)248-1999 Fax: (970)248-1104
Florida	Altantic Vocational Technical Center 4700 Coconut Creek Ft.Lauderdale, FL 33063 **Contact:** Mr. Frank Rose PH: (954)977-2000 Fax: (954)977-2016
	Gadsden Technical Institute 201 Experiment Station Road Quincy, FL 32351 **Contact:** Mr. Donald Mathews PH: (904)627-9651
	Manatee Vo-Tech 5603 34th Street West Bradenton, FL 34210-5297 **Contact:** Mr. J. Staffiles PH: (941)751-7900 Fax: (941)751-7927

STATE	PARTICIPATING ORGANIZATION
Florida	PTEC - St. Pete Campus 901 - 34th Street South St. Pete, FL 33711 **Contact:** Mr. John Stiles PH: (813)893-2500
	Sheridan Vocational Tech Center 5400 Sheridan Street Hollywood, FL 33021 **Contact:** Mr. John Devine PH: (305)985-3220 Fax: (305)985-3220
	William H. Turner Technical Adult Education Center 10151 N.W. 19th Ave. Miami, FL 33147 **Contact:** Mr. John R. Yochum PH: (305)691-8324 Fax: (305)693-9463
	Withlacoochee Technical Institute 1201 West Main Street Inverness, FL 34450-4696 **Contact:** Mr. Steve Kinard PH: (904)726-2430 Fax: (904)726-0210
Georgia	Brunswick College 3700 Altama Ave. Brunswick, GA 31520-3644 **Contact:** Mr. Barry Bray PH: (912)264-7214 Fax: (912)262-3283
	Lamar County Comprehensive High School Vocational Agriculture Department 1 Trojan Way Barnesville, GA 30204 **Contact:** Tyrone Bacon PH: (770)358-1756 Fax: (770)358-0911

STATE	PARTICIPATING ORGANIZATION
Georgia	North Georgia Tech P.O. Box 65 Clarkesville. GA 30523 **Contact:** Ms. Barbara Grant PH: (706)754-7700 Fax: (706)754-7777
	Thomasville High School 315 South Hansell Street Thomasville. GA 31792 **Contact:** Mr. Thomas M. McCall PH: (912)225-2634 Fax: (912)225-2663
Idaho	North Idaho College 1000 West Garden Ave. Coeur D'Alene. ID 83814 **Contact:** Dr. Barbara Bennett PH: (208)769-3443 Fax: (208)769-3459
Illinois	Danville Area Community College 2000 East Main Street Danville. IL 61832 **Contact:** Mr. Michael D. Summer PH: (217)443-8786 Fax: (217)443-8580
	Lake County High School Technology Campus 19525 W. Washington Street Grayslake. IL 60030-1194 **Contact:** Ms. Linda Helton PH: (618)395-4351 Fax: (618)392-4824
	Olney Central College 305 North West Street Olney, IL 62450 **Contact:** Mr. Ed Covey PH: (618)395-4351 Fax: (618)392-4824

STATE	PARTICIPATING ORGANIZATION
Indiana	New Castle Area Voctional School 801 Parkview Drive New Castle. IN 47362-2995 **Contact:** Ms. Beverly Hankenhoff PH: (317)529-3503 Fax: (317)593-6587
Iowa	South Eastern Community College 31 South 3rd Street Keokuk. IA 52632 **Contact:** Mr. Richard Weston PH: (319)524-5560 Fax: (319)524-9450
Kentucky	Ashland Regional Technology Center 4818 Roberts Drive Ashland. KY 41179 **Contact:** Mr. Bill Damron PH: (606)928-6427 Fax: (606)928-6420
	Belfry Area Technology Center Box 280 Belfry, KY 41514 **Contact:** Mr. Danny O'Neal PH: (606)353-4951 Fax: (606)353-0868
	Blackburn Education Center 3111 Spur Road Lexington. KY 40511-9000 **Contact:** Mr. William A. Skinner PH: (606)246-2366
	Boone County Area Technology Center 3320 Cougar Path Hebron. KY 41048 **Contact:** Mr. Douglas Runion PH: (606)689-7855

STATE	PARTICIPATING ORGANIZATION
Kentucky	Bowling Green High School 1801 Rockingham Lane Bowling Green, KY 42104 **Contact:** Mr. Steve J. Willoughby PH: (502)746-2300 Fax: (502)746-2305
	Bowling Green Regional Tech Center 1845 Loop Drive Bowling Green, KY 42106 **Contact:** Mr. Don Williams PH: (502)796-7461 Fax: (502)746-7466
	Breckinridge County Area Technology Center P.O. Box 68, Highway 60 Harned, KY 40144 **Contact:** Mr. Wayne Spencer PH: (502)756-2138 Fax: (502)756-2878
	Bullitt Co. Technology Center 395 High School Drive Shep, KY 40165 **Contact:** Ms. Beverly Dennison PH: (502)543-7018 Fax: (502)543-1691
	Carter County Center Rt. 5 Box 366 Olive Hill, KY 41164 **Contact:** Mr. Keith Walker PH: (606)286-4022 Fax: (606)286-8894
	Christian County Area Technology Center 705 North Elm Street Hopkinsville, KY 42240 **Contact:** Mr. M. Wayne Hartigan PH: (502)886-3734 Fax: (502)886-0068

STATE	PARTICIPATING ORGANIZATION
Kentucky	Clark County Area Technology Center P.O. Box 727 650 Boone Avenue Winchester, KY 40391 **Contact:** Mr. William Lockhart PH: (606)744-6387 Fax: (606)744-9979
	Corbin Area Technology Center 1909 South Snyder Avenue Corbin, KY 40701 **Contact:** Mr. Gilliam PH: (606)528-5338 Fax: (606)528-0532
	Eastside Center for Applied Technology 2208 Liberty Road Lexington, KY 40509 **Contact:** Mr. James Lamirande Mr. W.T. Wilson PH: (606)252-4464
	Edmonson County High School 220 High School Road Brownsville, KY 42210 **Contact:** Mr. Charlie Hopkins Ph: (502)597-2151
	Elliott County High School P.O. Box 687 Sandy Hook, KY 41171 **Contact:** Mr. Clarence C. Adbins Ph: (606)738-5225 Fax: (606)738-5409
	Foster Meade Area Vocational Center P.O. Box 130 Hwy. 10 West Vanceburg, KY 41179 **Contact:** Mr. Doug Enix Ph: (606)796-6106 Fax: (606)796-6508

STATE	PARTICIPATING ORGANIZATION
Kentucky	Franklin Simpson High School P.O. Box 389 400 South College Frankling, KY 42135 **Contact:** Mr. Frank Cardwell Ph: (502)586-3273 Fax: (502)586-2021
	Fulton County Aréa Technology Center 2720 Moscow Avenue Hickman, KY 42050 **Contact:** Mr. Todd Gossum Ph: (502)236-2517 Fax: (502)236-9395
	Garth Area Technology Center HC 79 Box 205 Martin, KY 41649 **Contact:** Mr. Terry Mosley Ph: (606)285-3088 Fax: (606)285-0274
	Garrard County Area Technology Center 306 W. Maple Lancaster, KY 40444 **Contact:** Mr. Larry Carter Ph: (606)792-2144
	Grayson County VEC 120 High School Road Leitchfield, KY 42754 **Contact:** Mr. Larry Baker Ph: (502)259-3195
	Green County Area Technology Center P.O. Box 167 Greensburg, KY 42743 **Contact:** Mr. Wayne Hines Ph: (502)932-4263 Fax: (502)932-3072

STATE	PARTICIPATING ORGANIZATION
Kentucky	Harrison County Area Technology Center 551 Webster Avenue Cynthiana, KY 41031-0000 **Contact:** Mr. Hodge Ph: (606)234-5286 Fax: (606)234-0658
	Harrodsburg Area Technology Center P.O. Box 626 661 Tapp Road Harrodsburg, KY 40330-1069 **Contact:** Mr. Ray L. Williams PH: (606)734-9329 Fax: (606)734-3613
	Holmes High School Chapman Vocational Division 25th & Madison Coivington, KY 41014 **Contact:** Mr. Terry Mann PH: (606)655-6950 Fax: (606)655-6950
	James D. Patton Area Center 3234 Turkey Foot Road Ft. Mitchell, KY 41017 **Contact:** Mr. Gene Penn PH: (606)341-2266
	Kentucky Tech Barren County Center Area Center 491 Trojan Trail Glasgow, KY 42141 **Contact:** Mr. Max Doty PH: (502)651-2196 Fax: (502)651-2197
	Kentucky Tech - Caldwell County Area Technology Center 130 Vocational School Road Princeton, KY 42445 **Contact:** Mr. Mickey Baver PH: (502)365-5563 Fax: (502)365-5609

STATE	PARTICIPATING ORGANIZATION
Kentucky	Kentucky Tech - Carroll County Area Technology Center 1704 Highland Avenue Carrollton, KY 41008 **Contact:** Mr. Thomas A. Turner PH: (502)732-4479
	Kentucky Tech - Central Technology Center 104 Vo-Tech Road Lexington, KY 40510 **Contact:** Mr. Alan K. Mattox PH: (606)246-2400
	Kentucky Tech - Clinton County AVEC Route 5 Box 5023 Albany, NY 42602 **Contact:** Dr. Harold Van Hook PH: (606)387-6448 Fax: (606)387-4035
	Kentucky Tech - Daviess County Campus 1901 Southeastern Parkway Owensboro, KY 42303 **Contact:** Mr. Barry Bowlds PH: (502)687-7260 Fax: (502)687-7208
	Kentucky Tech - Elizabethtown 505 University Drive Elziabethtown, KY 42701 **Contact:** Mr. Neil Ramer PH: (502)766-5133 Fax: (502)766-0505
	Kentucky Tech - Greenup Co. Box 4009 Ohio River Road Greenup, KY 4114 **Contact:** Mr. David Williams PH: (606)473-9344

STATE	PARTICIPATING ORGANIZATION
Kentucky	**Kentucky Tech** - Harlan Regional Tech Ctr. 164 Ballpark Road Harlan, KY 40831 **Contact:** Mr. Joel Eldridge PH: (606)573-1506
	Kentucky Tech - Hazard Regional 101 Vo-Tech Drive Hazard, KY 41701 **Contact:** Ms. Connie W. Johnson PH: (606)435-6101 Fax: (606)435-6088
	Kentucky Tech - Henderson Technology Center 2440 Zion Road Henderson, KY 42420 **Contact:** Mr. Armand St. Pierre PH: (502)827-3810 Fax: (502)827-8284
	Kentucky Tech - Jefferson State Campus 727 West Chestnut St. Louisville, KY 40203 **Contact:** Mr. Randy Clark PH: (502)595-4136 Fax: (502)595-4399
	Kentucky Tech - Laurel County St. VOC-TECH 235 S. Laurel Road London, KY 40741 **Contact:** Mr. Fayette Young PH: (606)864-7311
	Kentucky Tech - Lee County Campus 960 Center Street Beattyville, KY 41311 **Contact:** Mr. H.R. Gevedon PH: (606)464-5018 Fax: (606)464-0663

STATE	PARTICIPATING ORGANIZATION
Kentucky	Kentucky Tech - Leslie Campus P.O. Box 902 Hyden, KY 41749 **Contact:** Mr. Allen R. Adams PH: (606)672-2859
	Kentucky Tech - Mayo Campus 513 Third Street Paintsville, KY 41240-1095 **Contact:** Mr. Gary K. Coleman Ph: (606)789-5321 Fax: (606)789-9753
	Kentucky Tech - Ohio County Area Technology Center 1406 S. Main Hartford, KY 42347 **Contact:** Mr. Eddie D. McKinley PH: (606)274-9612 Fax: (606)274-9633
	Kentucky Tech - Somerset 230 Airport Road Somerset, KY 42501 **Contact:** Mr. Billy L. Wilson PH: (606)677-4049 Fax: (606)677-4050
	Kentucky Tech - Paducah Center 2400 Adam Street Paducah, KY 42001 **Contact:** Mr. Bob Ruoff PH: (502)443-6592
	Knox County Area Technology Center 210 Wall Street Barbourville, KY 40906 **Contact:** Mr. Charles L. Frazier PH: (606)546-5310 Fax: (606)546-5320

STATE	PARTICIPATING ORGANIZATION
Kentucky	LaGrange Education Center 3001 West Highway 146 LaGrange, KY 40032 **Contact:** Mr. Michael Stanfill PH: (502)222-9441 ext. 402
	Lake Cumberland Boy's Camp Treatment Center Route 4 Box 245 Monticello, KY 42633 **Contact:** Mr. Jim Guffey PH: (606)348-8811 Fax: (606)348-4953
	Letcher County Area Technology Center 610 Circle Drive Whitesburg, KY 41858 **Contact:** Mrs. Barbara Ison PH: (606)633-5053
	Livingston Central High School Vocational Welding P.O. Box 369 - Hwy. 60 Smithland, KY 42081 **Contact:** Mr. Tom Counts PH: (502)928-2065 Fax: (502)928-2112
	Madison Area Technology Center P.O. Box 809, 703 N. 2nd Richmond, KY 40475 **Contact:** Mr. Lowell D. Cook PH: (606)624-4500 Fax: (606)624-9659
	Madisonville Regional Technology Center 150 School Avenue Madisonville, KY 42431 **Contact:** Mr. Gerald Cannon PH: (502)824-7544 Fax: (502)825-5071

STATE	PARTICIPATING ORGANIZATION
Kentucky	Magoffin County Voactional School 201 Hornet Drive Salyersville, KY 41465 **Contact:** Mr. Toddie Preston PH: (606)349-5188 Fax: (606)349-5148
	Marion County Area Technology Center 721 E. Main St. Lebanon, KY 40033 **Contact:** Mr. Howard Carey PH: (502)692-3155
	Marshall County Area Vocational School 341 High School Benton, KY 42025 **Contact:** Mr. James D. Cothran PH: (502)527-8648 Fax: (502)527-1920
	Mason County Area Technology Center 646 Kenton Station Road Maysville, KY 41056 **Contact:** Mr. Clifford Wells PH: (606)759-7101 Fax: (606)759-7568
	Mayfield/Graves County Area Technology Center 710 Douthitt Street Mayfield, KY 42066 **Contact:** Ms. Teresa Harper PH: (502)247-4710 Fax: (502)247-4721
	Meade County Area Technology Center 110 Greer Street Bradenburg, KY 40108 **Contact:** Mr. Thomas King PH: (502)422-3955 Fax: (502)422-3307

STATE	PARTICIPATING ORGANIZATION
Kentucky	Monroe County Area Technology Center 309 Emberton St. Tompkinsville, KY 42167 **Contact:** Mr. Jeffery Berryman PH: (502)487-8261 Fax: (502)487-8316
	Morgan County Area Technology Center P.O. Box 249 - Road 191 West Liberty, KY 41472 **Contact:** Mr. William Runyon PH: (606)743-4321 Fax: (606)743-2971
	Murray/Calloway Vo-Tech 18th Sycamore Murray, KY 42071 **Contact:** Mr. Steve Simmons PH: (502)753-1870 Fax: (502)759-9656
	Nelson County Area Technology Center 1060 Bloomfield Road Bardstown, KY 40004 **Contact:** Mrs. Myra Wilson PH: (502)348-9096 Fax: (502)348-9097
	Northern Kentucky Tech 1025 Amsterdam Road Covington, KY 41011 **Contact:** Mr. Ed Burton PH: (606)292-3930 Fax: (606)92-6415
	Phelps Area Technology Center 11500 Phelps 632 Road Phelps, KY 41553 **Contact:** Mr. Curtis A. Akers PH: (606)456-8136 Fax: (606)456-7782

STATE	PARTICIPATING ORGANIZATION
Kentucky	Rockcastle County Area Technology Center P.O. Box 275 West Main Street Mt. Vernon, KY 40456 **Contact:** Ms. Donna B. Hopkins PH: (606)256-4346 Fax: (606)256-4331
	Rowan Regional Technology Center 609 Viking Drive Morehead, KY 40351 **Contact:** Mr. Kenneth J. Brown PH: (606)783-1538 Fax: (606)784-9876
	Russell Technology Education Center 705 Red Devil Lane Russell, KY 41169 **Contact:** Mr. Keith Parsons PH: (606)836-1256 Fax: (606)836-3784
	Russellville Area Technology Center 1103 West 9th Street Russellville, KY 42276 **Contact:** Mr. Keith D. Dickinson PH: (502)726-8432 Fax: (502)726-6303
	Wayne County Area Technology Center 150 Cardinal Way Monticello, KY 42633 **Contact:** Mrs. Anita Hopper PH: (606)348-8424 Fax: (606)348-5090
	West Kentucky Tech 5200 Blandville Road P.O. Box 7408 Paducah, KY 42002-7408 **Contact:** Mr. Keith Cooper PH: (502)554-4991 Fax: (502)554-9754

STATE	PARTICIPATING ORGANIZATION
Louisiana	Acadian Technical Institute P.O. Box 820 Crowley, LA 70526 **Contact:** Mr. Darryl L. Boullion PH: (318)788-7521 Fax: (318)788-7642
	Caddo Career Center 5950 Union Avenue Shreveport, LA 71108 **Contact:** Ms. Gayle Flowers PH: (318)636-5150 Fax: (318)621-9138
	Louisiana Technical College/LaFayette Campus 1101 Bertrand Drive LaFayette, LA 70506 **Contact:** Mr. Charles Lewis, Jr. PH: (318)262-5962 Fax: (318)262-5122
Maryland	Center of Applied Technology North 800 stevenson Road Severn, MD 21144 **Contact:** Ph.: 410-969-3100 Fax: 410-969-1967
	Center for Career & Technical Education 14211 McMullen Hwy S.W. Cresaptown, MD 21502 **Contact:** Mr. Vince King PH: (301)729-6489 Fax: (301)729-6314
	J.M. Tawes Career & Technology Center 7982 Crisfield Hwy Westover, MD 21871 **Contact:** Mr. Tim Gavigan PH: (410)651-2285 Fax: (410)651-3154

STATE	PARTICIPATING ORGANIZATION
Michigan	Kalamazoo Valley Community College 6767 West O Avenue P.O. Box 4070 Kalamazoo. MI 49003-4070 **Contact:** Mr. Richard Roder PH: (616)372-5398 Fax: (616)372-5458
	Lake Shore High School 22980 13 Mile St. Clair Shores. MI 48082 **Contact:** Mr. Dennis Hill PH: (810)296-8281 Fax: (810)296-8203
Minnesota	Anoka-Hennepin Technical College 1355 W. Highway 10 Anoka. MN 55303 **Contact:** Mr. Cliff Korkowski PH: (612)427-1880 Fax: (612)323-0447
Mississippi	Yazoo City Vo-Tech Center 1825 M.L. King Drive Yazoo City. MS 39194 **Contact:** Mr. Larry Summers PH: (601)746-7642 Fax: (601)746-0991 **Nevada**
Missouri	Mobertly Area Vo-Tech School 1625 Gratz Brown Street Mobertly, MO 65270 **Contact:** Mr. Mike Starr PH: (816)269-2690 Fax: (816)269-2692
Nevada	Great Basin College 1500 College Parkway Elko. NV 89801 **Contact:** Mr. Stan Popeck PH: (702)753-2207 Fax: (702)738-8771

STATE	PARTICIPATING ORGANIZATION
New Jersey	General Tech Inst. Welding Trade School 1118 Baltimore Avenue Linden, NJ 07036 **Contact:** Ms. Gloria D. Sytch Ph: (908)486-9353 Fax: (908)486-9321
	Mercer County Vo-Tech Schools 1085 Old Trenton Road Trenton, NJ 08690-1229 **Contact:** Mr. Jimmy Spears PH: (609)586-2121 Fax: (609)586-1709
	Morris County Vocational Tech. School District 400 East Main Street Denville, NJ 07834 **Contact:** Ms. MaryAnne E. Kemmet PH: (201)627-4600 ext. 222 Fax: (201)627-4958
New Mexico	Albuquerque Technical Vocational Institute (T.V.I.) 525 Buena Vista S.E. Albuquerque, NM 87106-4096 **Contact:** Mr. Joseph Rodman PH: (505)224-3714 Fax: (505)224-3781
New York	Modern Welding School 1740 Broadway Schenectady, NY 12306 **Contact:** Mr. Clay T. Corey PH: (518)374-1216 Fax: (518)374-1288
	Onondaga-Cortland-Madison BOCES Career Training Center 4500 Crown Road Liverpool, NY 13090-4538 **Contact:** Mr. Don Batista PH: (315)453-4455 Fax: (315)451-4676

STATE	PARTICIPATING ORGANIZATION
New York	Orlean - Niagara BOCES 3181 Saunders Settlement Road Sanborn, NY 14132 **Contact:** Mr. Lynn Wahler PH: (800)836-7510 ext. 453 Fax: (716)731-5931
North Carolina	Watauga High School 400 High School Drive Boone, NC 28607 **Contact:** Mr. Phillip Deadmon PH: (704)264-2407 Fax: (704)264-9030
Ohio	Canton South High School, ECSV Career Academy 600 Faircrest Street, S.E. Canton, OH 44706 **Contact:** Mr. Joe Briese PH: (216)484-8000 ext. 158 Fax: (216)484-8125
	Eastland Career Center 4465 S. Hamilton Road Groveport, OH 43125 **Contact:** Mr. Claude Graves PH: (614)836-5725
	Gallia-Jackson-Vinton J.V.S.D. P.O. Box 157 Rio Grande, OH 45674-0157 **Contact:** Mr. D. Kent Lewis PH: (614)245-5334 Fax: (614)245-9465
	Max S. Hayes Vocational High School 4600 Detroit Ave. Cleveland, OH 44102 **Contact:** Mr. Richard Hart PH: (216)631-1528 Fax: (216)634-2175

STATE	PARTICIPATING ORGANIZATION
Oklahoma	Eastern Oklahoma County Area Vocational Center #23 4601 N. Choctaw Road Choctaw, OK 73020-9017 **Contact:** Mr. Paul Childers PH: (405)390-9591 Fax: (405)390-9598
	Mid Del Lewis Eubanks Area Vo-Tech 1621 Maple Drive Midwest City, OK 73112 **Contact:** Mr. Dave Williams PH: (405)739-1707
	Mid-America Vo-Tech Box H Wayne, OK 73095-0210 **Contact:** Mr. Michael J. Roberts PH: (405)449-3391 Fax: (405)449-3421
	Red River Area Vo-Tech School P.O. Box 1807 Duncan, OK 73534-1807 **Contact:** Mr. Jerry Morris PH: (405)255-2903
Oregon	Central Oregon Community College 2600 N.W. College Way Bend, OR 97701-5998 **Contact:** Dr. Robert Barber PH: (503)383-7747 Fax: (503)383-7507
	Clatsop Community College 1653 Jermone Ave. Astoria, OR 97103 **Contact:** Ms. Lynda Hatfield Mr. Ed Reed PH: (503)325-0910 Fax: (503)325-5738

STATE	PARTICIPATING ORGANIZATION
Oregon	Treasure Valley Community College 650 College Blvd. Ontario. OR 97914-3423 **Contact:** Mr. Lane T. Hartnett PH: (503)889-6493 ext. 308
Pennsylvania	Career Institute of Technology 5335 Kesslersville Road Eaton. PA 18048-6799 **Contact:** Mr. Chris Kipp Ph: (610)258-2857 Fax: (610)258-0805
	Crawford Co. Vo-Tech School 860 Thurston Road Meadville. PA 16335-2198 **Contact:** Mr. William Powell Ph: (814)724-6024 Fax: (814)337-0602
	Lenape Area Vocational Technical School 2215 Chaplin Ave. Ford City, PA 16226 **Contact:** Mr. Daniel Mulvey PH: (412)763-7116 Fax: (412)763-9888
	Northern Montgomery County Technical Career Center Sumneytown Pike Lansdale. PA 19446 **Contact:** Dr. Michael Erwin PH: (215)368-1177
	Somerset County Area Vo-Tech School Rd. #5 Vo-Tech Road Somerset. PA 15501 **Contact:** Mr. Leroy Derstine PH: (814)443-3651 Fax: (814)445-6716

STATE	PARTICIPATING ORGANIZATION
Pennsylvania	The Center for Arts and Technology Brandywine Campus 1635 E. Lincoln Highway Coatesville, PA 19320 **Contact:** Mr. Ralph Kauffman PH: (610)384-1585
	Wilkes-Barre Area Vo-Tech School P.O. Box 1699 Wilkes-Barre, PA 18705 **Contact:** Mr. Frank Bielenda PH: (717)822-4131
South Carolina	Beaufort-Jasper Career Education Center RT 1, Box 127 Ridgeland, SC 29936 **Contact:** Mr. Syd Massey PH: (803)726-8107 Fax: (803)726-8102
	Central Carolina Technical College 506 N. Guignard Drive Sumter, SC 29150 **Contact:** Dr. Herbert Robbins PH: (803)778-1961 Fax: (803)773-4859
Tennessee	Tennessee Tech Center at Crossville 715 North Miller Avenue Crossville, TN 38555 **Contact:** Mr. Ronald C. Abner PH: (615)484-7502 Fax: (615)-484-8911
Texas	College of the Mainland 8001 Palmer Highway Texas City, TX 77591 **Contact:** Mr. Dean Bass PH: (409)938-1211 Fax: (409)938-7073

STATE	PARTICIPATING ORGANIZATION
Texas	Grayson County College 6101 Grayson Drive Denison, TX 75020 **Contact:** Mr. Paul Gordon PH: (903)465-6030 Fax: (903)463-5284
	Tyler Junior College P.O. Box 9020 Tyler, TX 75711 **Contact:** Ms. Joan Jones Ph: (903)510-2507 Fax: (903)510-2330
Utah	Ogden-Weber Applied Tech Center 559 E. ATC LANE Ogden, UT 84404 **Contact:** Mr. Brent Wallis PH: (801)627-8387 Fax: (801)392-2140
Vermont	North Country Career Center RR3 Box 540 P.O. Box 725 Newport, VT 05855-0725 **Contact:** Mr. Thomas Cope PH: (802)334-5469 Fax: (802)334-1618
Virginia	New River Community College Route 100 P.O. Box 1127 Dublin, VA 24084 **Contact:** Theodore R. Alberts PH: (540)674-3600 Fax: (540)674-3642
	Thomas Edison Technical Center 5801 Franconia Road Alexandria, VA 22310 **Contact:** Mr. Clive Lugmayer PH: (703)924-8100 Fax: (703)924-8197

STATE	PARTICIPATING ORGANIZATION
Washington	Centralia College 600 West Locust Street Centralia. WA 98532 **Contact:** Mr. Mike Driscoll PH: (360)736-9391
	Clark College 1800 E. McLoughlin Blvd Vancouver. WA 98663-3598 **Contact:** Mr. Philip Robertson PH: (360)992-2220 Fax: (360)992-2861
	Lincoln High School 701 S. 37 Tacoma, WA 98408 **Contact:** Mr. Grant Hosford PH: (206)596-2017 Fax: (206)596-2113
	Skaget Valley College 2405 E. College Way Mt. Vernon. WA 98273 **Contact:** Mr. Daniel Nelson Mr. Mark Bushaw PH: (360)428-1192 Fax: (360)428-1612
West Virginia	Carver Career Center 4799 Midland Drive Charleston. W. VA 25306 **Contact:** Mr. Christian V. Hudson PH: (304)348-1965 Fax: (304)348-1938
	Potomac State College AG Dept. Keyser. W. VA 26726 **Contact:** Mr. Rick Woodworth PH: (304)788-6986 Fax: (304)788-6941

STATE	PARTICIPATING ORGANIZATION
Wisconsin	Fox Valley Technical College 1825 North Bluemond Drive Appleton, WI 54913-2277 **Contact:** Mr. Kevin Dahle Mr. Dave Hoffman Mr. Bob Lamb PH: (414)735-5787 Fax: (414)735-2473
	Milwaukee North Divison High School 1011 West Center Street Milwaukee, WI 53206-3299 **Contact:** Mr. George Taylor PH: (414)265-1110 Fax: (414)265-6210
	Western Wisconsin Technical College 304 N. 6th St. P.O. Box 908 La Crosse, WI 54602-0908 **Contact:** Mr. Ron Sellnau PH: (6080785-9175 Fax: (608)785-9289

American Welding Society

EDUCATING
TO WORLD CLASS
STANDARDS

The Case for National Skills Standards

To help address the skills gap situation, the U.S. Departments of Labor and Education funded 22 national skills standards. The goal is the development and establishment of national, voluntary industry-based standards for a number of occupations that currently employ over 40% of the U.S. work force.

Most experts agree that national standards without accompanying credentials will have little influence with industry and education. Such credentials would act as existing standards that define the level of knowledge and skills individuals are expected to achieve by the time they complete an educational program. Credentials also serve as informal entrance standards for individuals before they enter employment or training.

Diane Ravitch, chief architect of national education standards in the Bush administration, remains an advocate of the idea. "Americans...expect strict standards to govern construction of buildings, bridges, highways, and tunnels; shoddy work would put lives at risk...They expect stringent standards to protect their drinking water, the food they eat, and the air they breathe... Standards are created because they improve the quality of life.

Ravitch recognizes that education is different from bridges and water. She notes that when George Bush, Bill Clinton and other political leaders established the first set of national goals for education in 1989 and 1990, "they did not realize that educators were divided about what competency is and how it should be demonstrated, about which subjects should be taught to which students, and about the value of challenging students with higher standards."

Because Ravitch understood these things only too well, she insisted that standards were needed. She still thinks so even though she is dissatisfied with some of the standards that have begun to appear. Standards can improve achievement, she believes, "by clearly defining what is to be taught and what kind of performance is expected." To those who fear that the standards movement may contribute to inequality, she contends that an "essential purpose of standards is to ensure that students in all schools have access to equally challenging programs and courses of study."

The Competitiveness Policy Council in its Report of the Education Subcouncil, March 1994, states:

"Our Subcouncil was particularly impressed, and troubled, by how unsystematic and directionless our education system is and by how basic issues of teaching and learning have been neglected in this nation. We believe the key to turning this around consists of the following strategy: Adopt clear and high standards for what students should know and be able to do as a result of their schooling; develop the capacity of schools to teach to high standards and the capacity of youngsters to achieve results."

Report on National Vocational Education

This long awaited federal report recommends classes that are rigorous, based on high industry-oriented skills standards, assessed by reliable methods, and that lead to portable credentials.

Welding has been selected as a field suitable for skills standardization. After analysis by the General Accounting Office (GAO) welding, as an occupation, met all the following criteria:

- high employment or growth
- has a national credential
- is industry driven
- growth in certification seekers
- has individual certification options

Welding is one of the 22

There are over 95,000 standards in the U.S., but only 22 national skills standards.

The American Welding Society was awarded a grant from the Department of Education to prepare national skills standards for welders.

Welders are important because they permanently join metals in an efficient and economic way. They make almost everything we use in our daily life, from coffee pots to nuclear reactors. The impact of welding cannot be fully measured. There is no way to determine the value of weldments produced, but experts estimate that up to 50% of the GNP of the United States is produced by welding.

There are many factors that will require more and better trained welders. New higher strength materials are being introduced that require special welding procedures. New codes and specifications are being adopted that require higher quality welds. There is also the new concept in manufacturing that requires welds to be of the highest quality. New government regulations and personal safety requirements dictate stricter codes and more products require certified and qualified welders to weld them.

It Just Makes SENSE

According to AWS Director of Education Bob Reeve, for schools looking to increase the hiring rate of their students, it makes sense to consider adopting a national skills standard. "The emphasis is on education that produces employable graduates. By employable I mean a student who has shown a certain level of competency in the right skills," offers Reeves. "AWS has produced one of the first truly national skills standards in EG2.0-95, *Guide for the Training and Qualification of Welding Personnel: Entry Level Welder*. Now we have the next step; the Level II-Advanced Welder."

The Level II-Advanced Welder standard Reeve referenced was developed from input provided by industry, educators, and government under the strict ANSI rules that ensure a consensus document. It's formally called *EG3.0-96, Guide for the Training and Qualification of Welding Personnel: Level II-Advanced Welder.*

To encourage adoption of the standards, which ultimately will have three levels, AWS has organized Schools Excelling through National Standards Education - S.E.N.S.E. At present, this innovative program offers the Entry Level Welder skills standard Level II-Advanced Welder skills standard, the level II advanced welder standard, complete curriculums, enrollment of participating organizations in the AWS National Registry, a complete welding educator's library, and Institutional Membership in the American Welding Society itself.

Schools that are willing to commit to the provisions of the program's Quality Assurance Manual are eligible to join S.E.N.S.E. With a one-time fee and registration, or an upgrade to pursue the higher levels, S.E.N.S.E. participating organizations are entitled to select three professionals for individual AWS memberships, begin receiving the industry recognized AWS *Connection* Newsletter, and are provided a handsome membership certificate.

On a per fee basis, AWS provides final exams and grading for students attending S.E.N.S.E. participating organizations. Students passing final exams receive the Entry Level Welder and/or Level II-Advanced Welder Certificates and are enrolled in the AWS National Registry for one year. They may also test to become AWS Certified Welders at an AWS Accredited Test Facility. Most educators agree that a portable certificate attesting to a skill level is essential.

Benefits of Joining S.E.N.S.E.:

Level I

- QC10-95 Qualification & Certification Standard
- EG2.0-95 Curriculum Guide
- Quality Assurance Manual
- National Registry as Level I Participating Organization
- AWS Educational Institution Membership Application
- First Part of Welding Educator's Library
- Students - AWS Certified Entry Level Welder
- Level I - Final Examinations (3 sets)

Cost:
$500 Level I.

Level II

- QC11-96 Qualification & Certification Standard
- EG3.0-96 Curriculum Guide
- National Registry as Level II. Participating Organization
- Second Part of Welding Educator's Library
- Students - AWS Certified Level II - Advanced Welders
- Level II - Final Examination

Cost:
$600 Level I and Level II
$100 Upgrade from Level I

American Welding Society

The American Welding Society, founded in 1919, is a multifaceted, nonprofit organization whose major goal is advancing the science, technology and application of welding and related joining disciplines. From factory floor to high-rise construction, from military weaponry to home products, AWS has led the way in supporting welding education and technology development to ensure a strong, competitive and comfortable way of life for America and its people.

If this special Skills Standard Package does not contain all of the following, please call toll free (800) 443-WELD, Ext. 229.

1. AWS QC11-96, *Specification for Qualification and Certification for Level II - Advanced Welders*
2. AWS EG3.0-96, *Guide for the Training and Qualification of Welding Personnel - Level II Advanced Welder*
3. AWS Report on Fulfilling National Skills Standards for the U.S. Department of Education
4. Catalog: AWS publications for Welding Educator's Library
5. Application: Schools Excelling through National Standards Education
6. Brochure and Application: AWS Educational Institution Membership

Instructions

1. Complete Participating Organization Form
2. Sign Letter of Commitment
3. Complete Educational Institution Form (Level I Only)
4. Mail Completed Documents To:

American Welding Society
Attn: Accounting Department
550 NW LeJeune Road
Miami, FL 33126

For Information Call
1-800-443-9353

Subject	**Extension**
Processing Status	288
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AWS SENSE PROGRAMS

"SCHOOLS EXCELLING THROUGH NATIONAL STANDARDS EDUCATION"

SENSE PROGRAMS

☞ **ORIGIN - ENTRY LEVEL WELDER**

☞ **U. S. DEPARTMENT OF EDUCATION GRANT**

- AWS Awarded A U. S. DOEd Grant July 1994
- Welding One Of 22 National Skill Standards Projects
- Estimates Indicate 50% Of GNP Involves Welding

☞ **ENTRY LEVEL PROJECT SCOPE**

- Develop A Standard For Entry Level Welders Skills
- Develop A Curriculum For Training Entry Level Welder
- Develop A Certification Program For Entry Level Welders
- Beta Testing Of Curriculum Through Training Of Unskilled Individuals

SENSE PROGRAMS - ENTRY LEVEL

☞PROJECT IMPLEMENTATION

- Education Grant Committee Formed
- Members Include:

  Business Community - Employers Of Welders

  Trade Unions - Representatives Of Welders

  Educators - Trainers Of Welders

  Technical - Intellectual Leaders Of Welders

  American Welding Society - Professional Organization Representing Welders

SENSE - 3

SENSE PROGRAMS - ENTRY LEVEL

☞PROJECT DEVELOPMENT PROCESS

- Entry Level Welder Definition Constructed
- Occupational Analysis Conducted
  - Needs Assessment
  - Needs Analysis
  - Task Analysis
  - Curriculum Development
  - Beta Training Of Curriculum
  - Standard Development
  - Program Implementation

SENSE PROGRAMS - ENTRY LEVEL

☞NEEDS ASSESSMENT INSTRUMENT

- Direct Mail National Survey Of AWS Membership

  230 Questions

- Survey Population

  5:1 Ratio Experienced Welders & Supervisors To All

  Other SIC Job Classifications Listed

  Broad Range Of Industries Involved In Welding

  Broad Range Of Industrial & Educational Areas

SENSE PROGRAMS - ENTRY LEVEL

☞NEEDS ANALYSIS

- Survey Response
  - 20%+ Response To Survey
  - Response Total Validates Survey Instrument
  - All Job Classifications Respond (5:1 Ratio Maintained)
  - All Business Areas Respond
  - All Industrial & Educational Areas Respond
  - Responses From All 50 States
- Industry Indicates A Written Test Of Related Knowledge, Procedures And Safety Is Required In Addition To Hands-On Training
- Entry Level Welder Profile Emerges

SENSE PROGRAMS - ENTRY LEVEL

☞TASK ANALYSIS

- Task Listing Derived From Entry Level Welder Profile
- Task Analysis Sheets Constructed
  - Standards Of Performance Identified
  - Related Information Identified
  - Workplace Skills Identified
  - Materials, Equipment And Tools Identified
- Data Converted To Programmatic Materials
  - Conversion From The Workplace To Training

SENSE PROGRAMS - ENTRY LEVEL

☞PROGRAM DEVELOPMENT

- Standard Establishes Requirements for Program Administration And Certification
- Curriculum Guidelines Identify Training Requirements
- Standard And Curriculum Form The Entry Level Welder Program
- Final Committee Review And Approval
- Entry Level Welder Certification Program Implemented January 1995
- Third Party Evaluation Of Project Conducted
- 10,000 Entry Level Welder Skill Standard Kits Mailed To Educational Institutions Nationally

SENSE PROGRAMS - LEVELS II & III

☞PROGRAM DEVELOPMENT

- Same Methods Used From Entry Level Welder Study
- Existing Committee Forms As Education Grant II
- New Needs Assessment Conducted For Level III
- Needs Analysis Of Existing Data Used For Level II
- New Needs Analysis Conducted For Level III
- Level II And Level III Welder Profiles Emerge
- Curriculums And Standards Developed
- Level II & Level III Certification Programs Developed
- Level II - Advanced Welder Approved April 1996
- Level III - Expert Welder Approved June 1996
- 10,000 Kits Distributed To Educational Institutions Nationally

SENSE PROGRAMS

☞ENTRY LEVEL WELDER PROGRAM

- QC10 - Entry Level Welder Standard
- EG2.0 - Entry Level Welder Curriculum Guidelines

☞LEVEL II - ADVANCED WELDER PROGRAM

- QC11 - Level II - Advanced Welder Standard
- EG3.0 - Level II - Advanced Welder Curriculum Guidelines

☞LEVEL III - EXPERT WELDER PROGRAM

- QC12 - Level III - Expert Welder Standard
- EG4.0 - Level III - Expert Welder Curriculum Guidelines

AWS QC10

ENTRY LEVEL WELDER

PROGRAM

ENTRY LEVEL WELDER

☞STANDARD

- AWS QC10-96, Specification for Qualification and Certification for Entry Level Welders

☞CURRICULUM GUIDELINES

- AWS EG3.0, Guide for the Training and Qualification of Welding Personnel - Entry Level Welders

ENTRY LEVEL WELDER

☞ **FIRST NATIONAL WELDER SKILL STANDARD**

☞ **NEEDS ANALYSIS & ASSESSMENT**
- 1994 National Consensus By Survey Of Welding Industry And Occupational Analysis

☞ **COMPARED TO**
- 1992 AWS Education Committee Consensus - Guide For The Training And Qualification Of Welding Personnel - Welders
- 1988 DACUM Facilitation - Entry Level Welder Skills

☞ **APPROVED BY**
- AWS Education Grant Committee Consensus - Based on Needs Assessment & Analysis Of Existing Data

ENTRY LEVEL WELDER

☞DEFINITION

An Individual Employed In This Position Is Considered To Possess A Prerequisite Amount of Knowledge, Attitude, Skills And Habits Required To Perform Procedures That Involve Routine, Predictable, Repetitive Tasks Involving Motor Skills And Limited Theoretical Knowledge While Working Under Close Supervision

ENTRY LEVEL WELDER

☞TRAINING EVALUATION

- Written Examination - Safety And Welding Related Knowledge
- 7 Workmanship Qualification Tests
- 1 Performance Qualification Test
  Non-Code Certified
- All Testing And Examination Administer By The Participating Organization

ENTRY LEVEL WELDER

☞TRAINING EVALUATION

☞Safety And Welding Related Knowledge

- Safe Practices - 90%
- Closed Book Welding Fundamentals - 75% Combined
- Retesting May Be Administered On All Portions Of The Written Test Until Competency Is Achieved
- Retesting Shall Not Supersede The Authority Of The Local Training Evaluation Criteria As Established In The Facility's Guidelines

ENTRY LEVEL WELDER

☞TRAINING EVALUATION

☞Welder Performance (Non-Code Certified)

- Workmanship Samples
- Performance Qualification
- Retesting May Be Administered On All Portions Of The Workmanship Or Performance Qualification Tests Until Competency Is Achieved
- Retesting Shall Not Supersede The Authority Of The Local Training Evaluation Criteria As Established In The Facility's Guidelines

SENSE PROGRAMS

☞CERTIFICATION REQUIREMENTS

☞Entry Level

- Written Examination - One Part
  Fundamentals & Safety
- Qualification By Workmanship Testing
- Qualification By Performance Qualification Testing
  Non-Code Certified Welder
- $15 Processing Fee To Receive AWS Certification

AWS QC11

LEVEL II - ADVANCED WELDER

PROGRAM

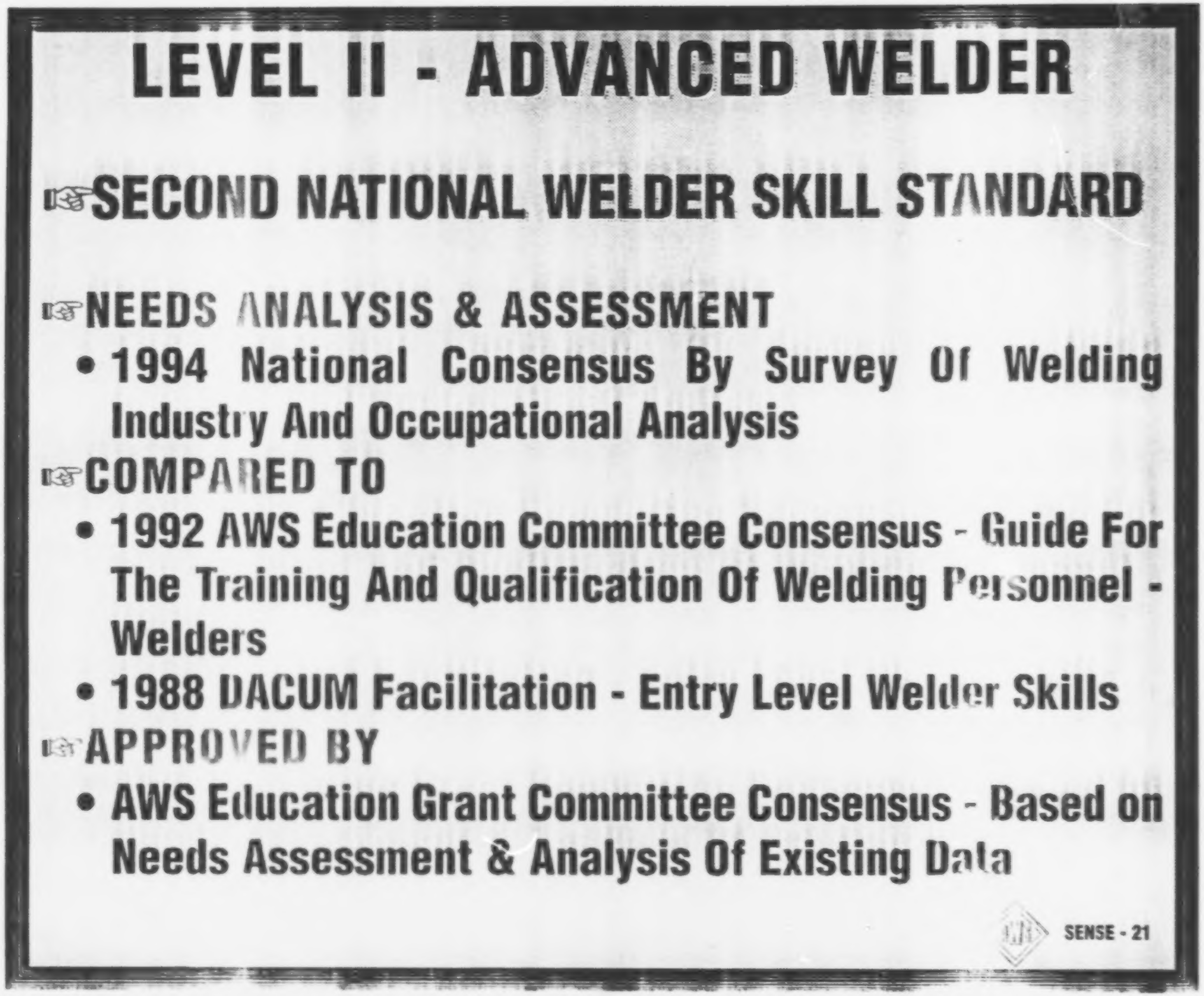
LEVEL II - ADVANCED WELDER

☞**STANDARD**

- **AWS QC11-96, Specification for Qualification and Certification for Level II - Advanced Welders**

☞**CURRICULUM GUIDELINES**

- **AWS EG3.0, Guide for the Training and Qualification of Welding Personnel - Level II - Advanced Welders**



LEVEL II - ADVANCED WELDER

☞SECOND NATIONAL WELDER SKILL STANDARD

☞**NEEDS ANALYSIS & ASSESSMENT**

- 1994 National Consensus By Survey Of Welding Industry And Occupational Analysis

☞**COMPARED TO**

- 1992 AWS Education Committee Consensus - Guide For The Training And Qualification Of Welding Personnel - Welders
- 1988 DACUM Facilitation - Entry Level Welder Skills

☞**APPROVED BY**

- AWS Education Grant Committee Consensus - Based on Needs Assessment & Analysis Of Existing Data

LEVEL II - ADVANCED WELDER

☞DEFINITION

An Individual Employed In This Position Is Considered To Possess A Prerequisite Amount of Knowledge, Attitude, Skills And Habits Required To Perform Proceduralized Tasks Under General Supervision, And Complex Tasks Involving The Use Of Theoretical Knowledge And Motor Skills Under Close Supervision

LEVEL II - ADVANCED WELDER

☞TRAINING EVALUATION

- Written Examination - Two Parts

  Safety And Welding Related Knowledge

  Welding Specification Interpretation
- Welder Performance (Non Code Certified)
- Welder Performance (Certified By Code or Standard)

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LEVEL II - ADVANCED WELDER

☞TRAINING EVALUATION

☞**Safety And Welding Related Knowledge**

- Safe Practices - 90%
- Closed Book Welding Fundamentals - 75%
- Open Book Welding Specification Interpretation - 75%
- Retesting May Be Administered On All Portions Of The Written Test Until Competency Is Achieved
- Retesting Shall Not Supersede The Authority Of The Local Training Evaluation Criteria As Established In The Facility's Guidelines

LEVEL II - ADVANCED WELDER

☞TRAINING EVALUATION

☞Welder Performance (Non Code Certified)

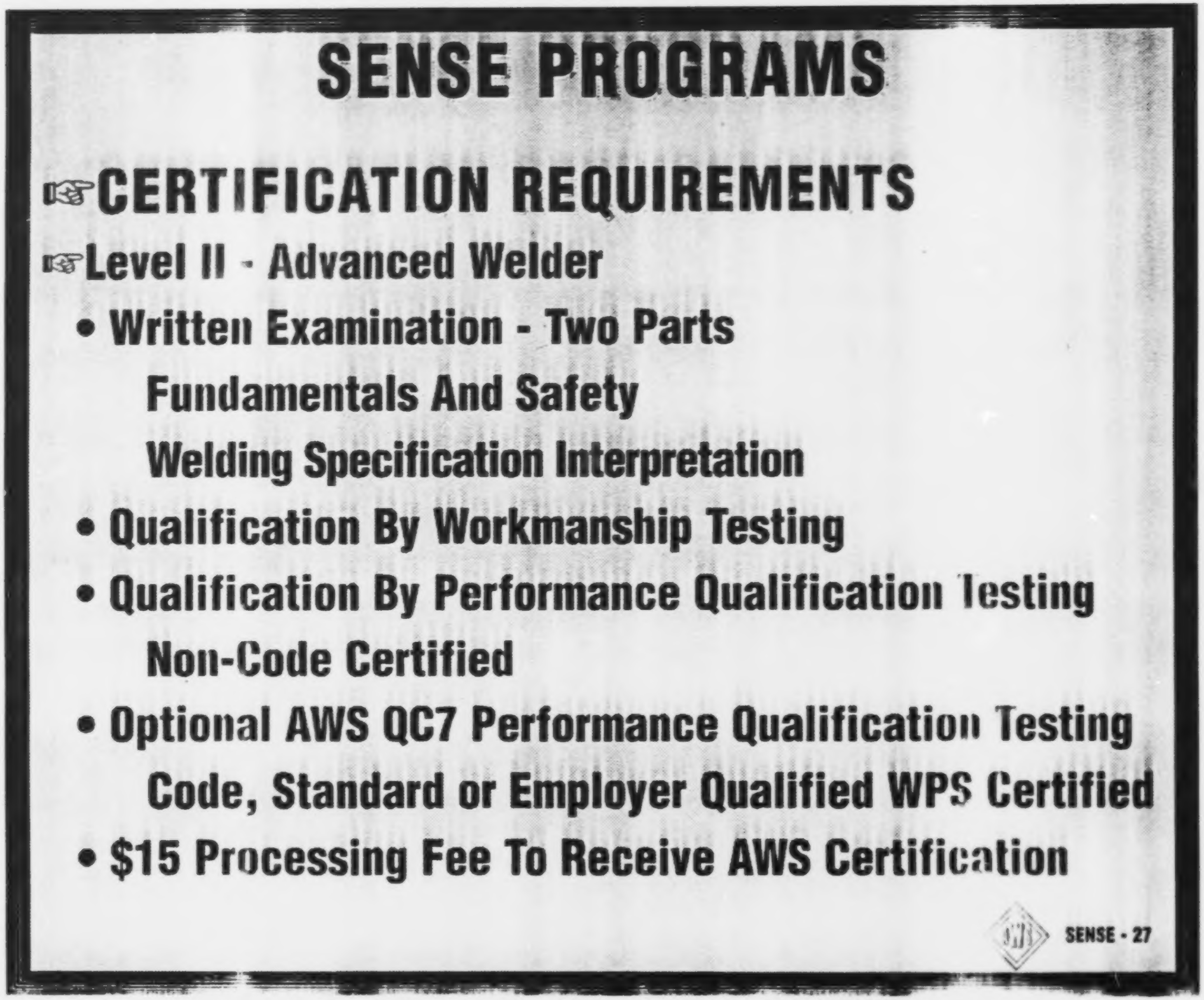
- Workmanship Samples
- Performance Qualification
- Retesting May Be Administered On All Portions Of The Workmanship Or Performance Qualification Tests Until Competency Is Achieved
- Retesting Shall Not Supersede The Authority Of The Local Training Evaluation Criteria As Established In The Facility's Guidelines

LEVEL II - ADVANCED WELDER

☞TRAINING EVALUATION

☞Welder Performance (Certified By Code or Standard)

- Optional AWS QC7 - Welder Performance Qualifications
- Administered Using AWS QC7, Supplement G
- Conducted At An AWS QC4, Accredited Test Facility
- May Use Any Recognized Code, Standard or Employer's Qualified Welding Procedure
- Recognized Code, Standard Or Qualified WPS Must Meet Or Exceed Level II Requirements
- Retesting In Accordance With AWS QC7 Rules



SENSE PROGRAMS

☞CERTIFICATION REQUIREMENTS

☞Level II - Advanced Welder

- Written Examination - Two Parts
  - Fundamentals And Safety
  - Welding Specification Interpretation
- Qualification By Workmanship Testing
- Qualification By Performance Qualification Testing
  - Non-Code Certified
- Optional AWS QC7 Performance Qualification Testing
  - Code, Standard or Employer Qualified WPS Certified
- $15 Processing Fee To Receive AWS Certification

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AWS QC12

LEVEL III - EXPERT WELDER

PROGRAM

LEVEL III - EXPERT WELDER

☞STANDARD

- AWS QC12-96, Specification for Qualification and Certification for Level III - Expert Welders

☞CURRICULUM GUIDELINES

- AWS EG4.0, Guide for the Training and Qualification of Welding Personnel - Level III - Expert Welders

LEVEL III - EXPERT WELDER

- ☞THIRD NATIONAL WELDER SKILL STANDARD
- ☞NEEDS ANALYSIS & ASSESSMENT
  - 1995 National Consensus By Survey Of Welding Industry And Occupational Analysis
- ☞COMPARED TO
  - 1994 National Consensus By Survey
  - 1992 AWS Education Committee Consensus - Guide For The Training And Qualification Of Welding Personnel - Welders
  - 1988 DACUM Facilitation - Entry Level Welder Skills
- ☞APPROVED BY
  - AWS Education Grant Committee Consensus - Based on Needs Assessment & Analysis Of Existing Data

LEVEL III - EXPERT WELDER

☞DEFINITION

An Individual Employed In This Position Is Considered To Possess A Prerequisite Amount of Knowledge, Attitude, Skills And Habits Required To Perform Tasks Autonomously, Including The Selection And Use Of Appropriate Techniques and Equipment, And To Apply Theoretical Knowledge And Motor Skills With Minimum Supervision

AWS SENSE - 31

LEVEL III - EXPERT WELDER

☞TRAINING EVALUATION

- Prerequisite Entry & Level II Welder Training
- 3 Part Written Examination
  - Part A - Welding Fundamentals And Safety
  - Part B - Practical Welding Specification Interpretation (visual examination of welds)
  - Part C - Code Book Interpretation
- Welder Performance (Non-Code Certified)
- Optional Written Examination (AWS QC1- CWI)
- Optional Welder Performance (AWS QC7 - Certified Welder To A Code Or Standard)

LEVEL III - EXPERT WELDER

☞TRAINING EVALUATION

☞Written Examination - All Parts

- Safe Practices - 90% Minimum Passing Score
- Parts A, B, C - 75% Minimum Passing Score Each
- Retesting May Be Administered On All Portions Of The Written Test Until Competency Is Achieved
- Retesting Shall Not Supersede The Authority Of The Local Training Evaluation Criteria As Established In The Facility's Guidelines

LEVEL III - EXPERT WELDER

☞TRAINING EVALUATION

☞**Written Examination - Part A**

- Closed Book Examination
- Safe Practices
- Welding Fundamentals

☞**Written Examination - Part B**

- Open Book Examination
- Visual Examination Of Weld Samples To A Specification

☞**Written Examination - Part C**

- Open Book Examination
- Code Book Interpretation
- Choice Of AWS D1.1, API 1104 or ASME B31.1, Sec. IX

LEVEL III - EXPERT WELDER

☞TRAINING EVALUATION

☞**Welder Qualifications (Non Code Certified)**

- **Performance Qualification Testing**
- **Retesting May Be Administered On All Portions Of The Performance Qualification Tests Until Competency Is Achieved**
- **Retesting Shall Not Supersede The Authority Of The Local Training Evaluation Criteria As Established In The Facility's Guidelines**

LEVEL III - EXPERT WELDER

☞OPTIONAL TRAINING EVALUATION

☞Written Examination

- AWS QC1, Certified Welding Inspector Examination
- Administered At An Approved AWS Exam Site By An AWS Test Supervisor
- Applicant Meets AWS CWI Education, Experience And Examination Requirements Per AWS QC12 And AWS QC1
- Applicant Meets AWS CAWI Education, Experience And Examination Requirements Per AWS QC12 And AWS QC1 With 72% Minimum Passing Score.
- All Applicants Pass A Supplemental Safety Exam With 90% Minimum Passing Score

LEVEL III - EXPERT WELDER

☞OPTIONAL TRAINING EVALUATION

☞Welder Performance (Certified By Code or Standard)

- Optional AWS QC7 - Welder Performance Qualifications
- Administered Using AWS QC7, Supplement G
- Conducted At An AWS QC4, Accredited Test Facility
- May Use Any Recognized Code, Standard or Employer's Qualified Welding Procedure
- Recognized Code, Standard Or Qualified WPS Must Meet Or Exceed Level III Requirements
- Retesting In Accordance With AWS QC7 Rules

SENSE - 37

LEVEL III - EXPERT WELDER

☞OPTIONAL TRAINING EVALUATION

☞Current CWI Or CAWI Certified

- **Current AWS QC1 CWI's Or CAWI's With A Minimum Passing AWS QC1 Exam Score Of 72% Shall:**
  - **Be Recognized As Having Met The Requirements For AWS QC12 Written Examination Provided They Meet the Requirements Set Forth In AWS QC12 And AWS EG4.0, Section 5.**
  - **Pass A Supplemental Safety Examination With A Minimum Passing Score Of 90%**

LEVEL III - EXPERT WELDER

☞OPTIONAL TRAINING EVALUATION

☞Current AWS QC7 - Certified Welders

- Current AWS QC7 Certified Welders Shall Be Recognized As Having Met The Requirements Of AWS QC12 Performance Qualification If:
  - The AWS QC7 Certification Meets Or Exceeds Welder Performance Qualification Requirements Set Forth In The AWS QC12 – Expert Welder Program And AWS EG4.0, Section 4, For Any Welder Performance Qualification Test Being Superceded By The Current Certification.

SENSE PROGRAMS

☞CERTIFICATION REQUIREMENTS

☞Level III - Expert Welder

- Written Examination - 3 Parts
  - Fundamentals & Safety
  - Specification Interpretation And Visual Inspection
  - Code Book Interpretation
- Optional AWS QC1 CWI Written Examination
  - Requires Supplemental Safety Examination
- Qualification By Performance Qualification Testing
  - Non-Code Certified
- Optional AWS QC7 Performance Qualification Testing
  - Code, Standard or Employer Qualified WPS Certified
- $15 Processing Fee To Receive AWS Certification

AWS SENSE PROGRAMS

"SCHOOLS EXCELLING THROUGH NATIONAL STANDARDS EDUCATION"

REGISTERING FOR PARTICIPATION

SENSE PROGRAMS

☞ SENSE PROGRAM #1

☞ AWS QC10 - ENTRY LEVEL WELDER

- Participating Organizations Register And Receive:
  - Reference Library
  - Final Examinations
  - Educational Institution Membership
  - Welder Certifications
- Entry Level Welders Are Entered Into The National Registry of Entry Level Welders

SENSE PROGRAMS

☞**SENSE PROGRAM #2**

☞**AWS QC11 LEVEL II - ADVANCED WELDER**

- Participating Organizations Register And Receive:
  - Additional Standards For Educator's Library
  - Final Examinations
  - Welder Certifications
- Level II Welders Are Entered Into The National Registry of Level II - Advanced Welders
- Registration As An Entry Level Welder PO Required

SENSE PROGRAMS

☞SENSE PROGRAM #3

☞AWS QC12 LEVEL III - EXPERT WELDER

- Participating Organizations Register And Receive:
  - Additional Standards For Educator's Library
  - Final Examinations
  - Welder Certifications
- Level III Welders Are Entered Into The National Registry of Level III - Expert Welders
- Registration As An Entry & Level II Welder PO Required

SENSE PROGRAMS

☞ SIGN-UP OPTIONS

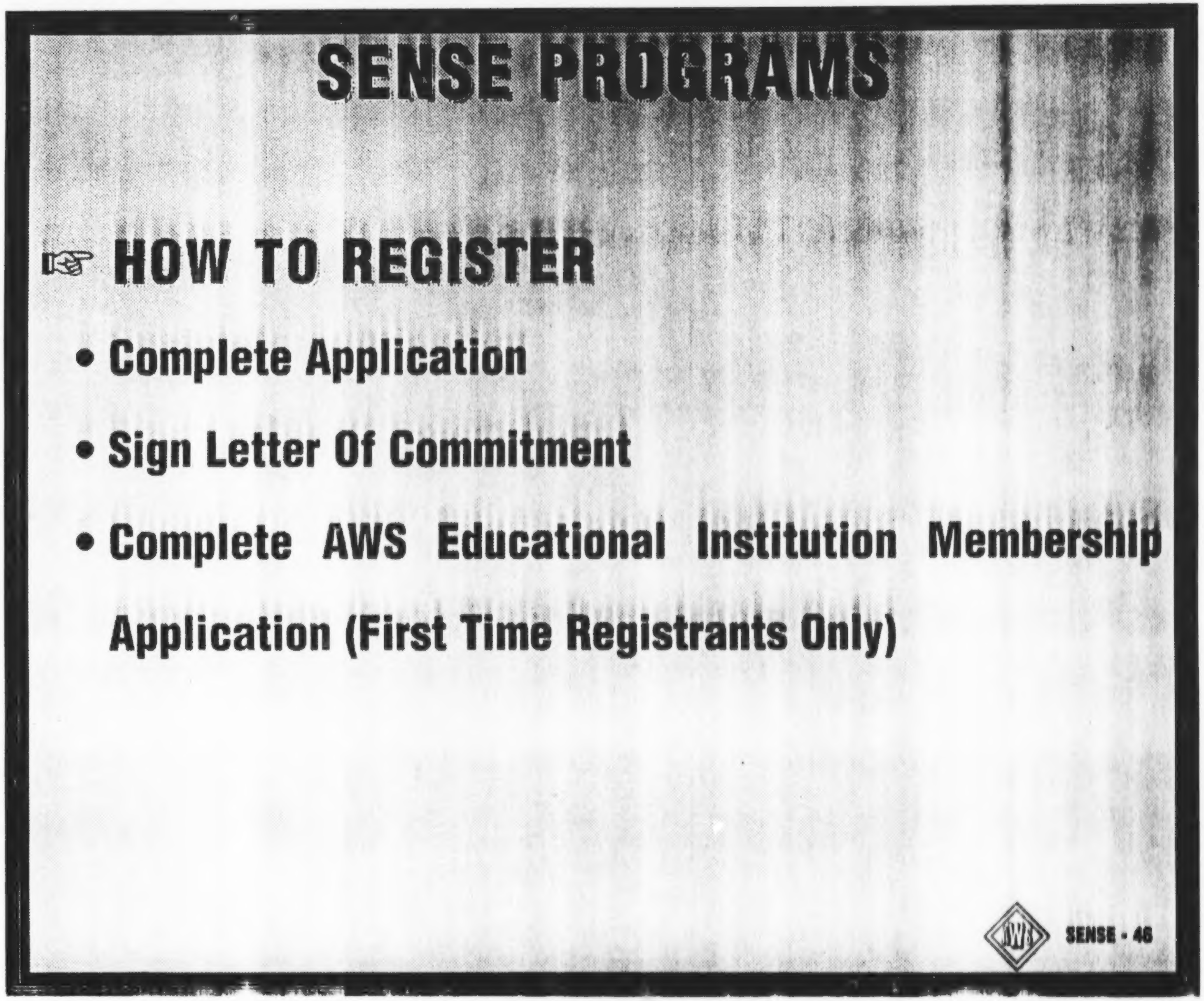
- Register for Entry Level Welder Program Only.

  Cost: $500
- Register For Entry, Advanced And Expert Welder Programs

  Cost: $1550
- Registered Participating Organizations Upgrade To Next Level Of Welder Training

  Cost: $100 — Level II

  Cost: $950 — Level III
- Cannot Register For Level II & Level III Alone
- Entry Level Welder PO Registration Required For Participation At All Levels



SENSE PROGRAMS

☞ HOW TO REGISTER

- Complete Application
- Sign Letter Of Commitment
- Complete AWS Educational Institution Membership Application (First Time Registrants Only)

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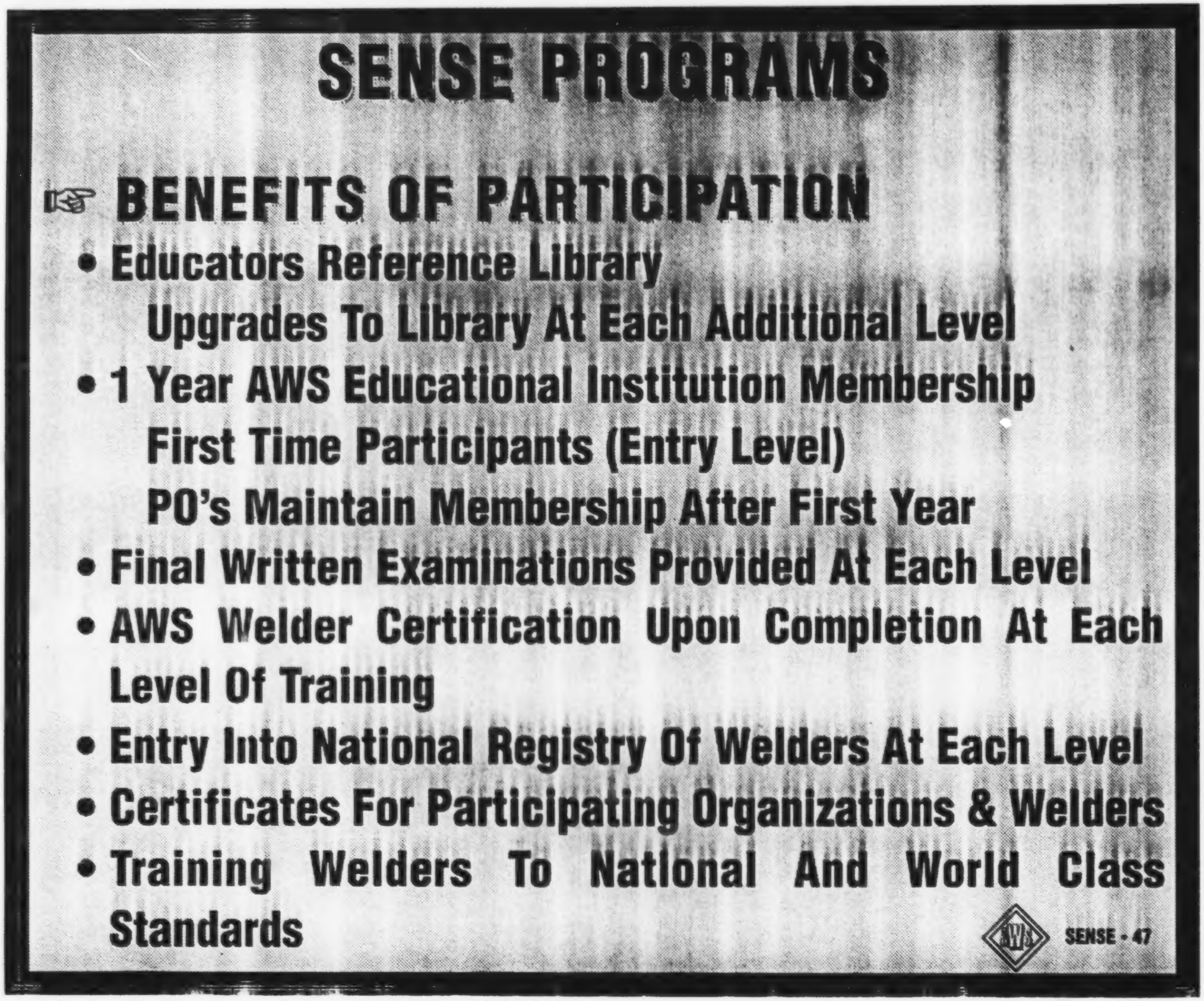
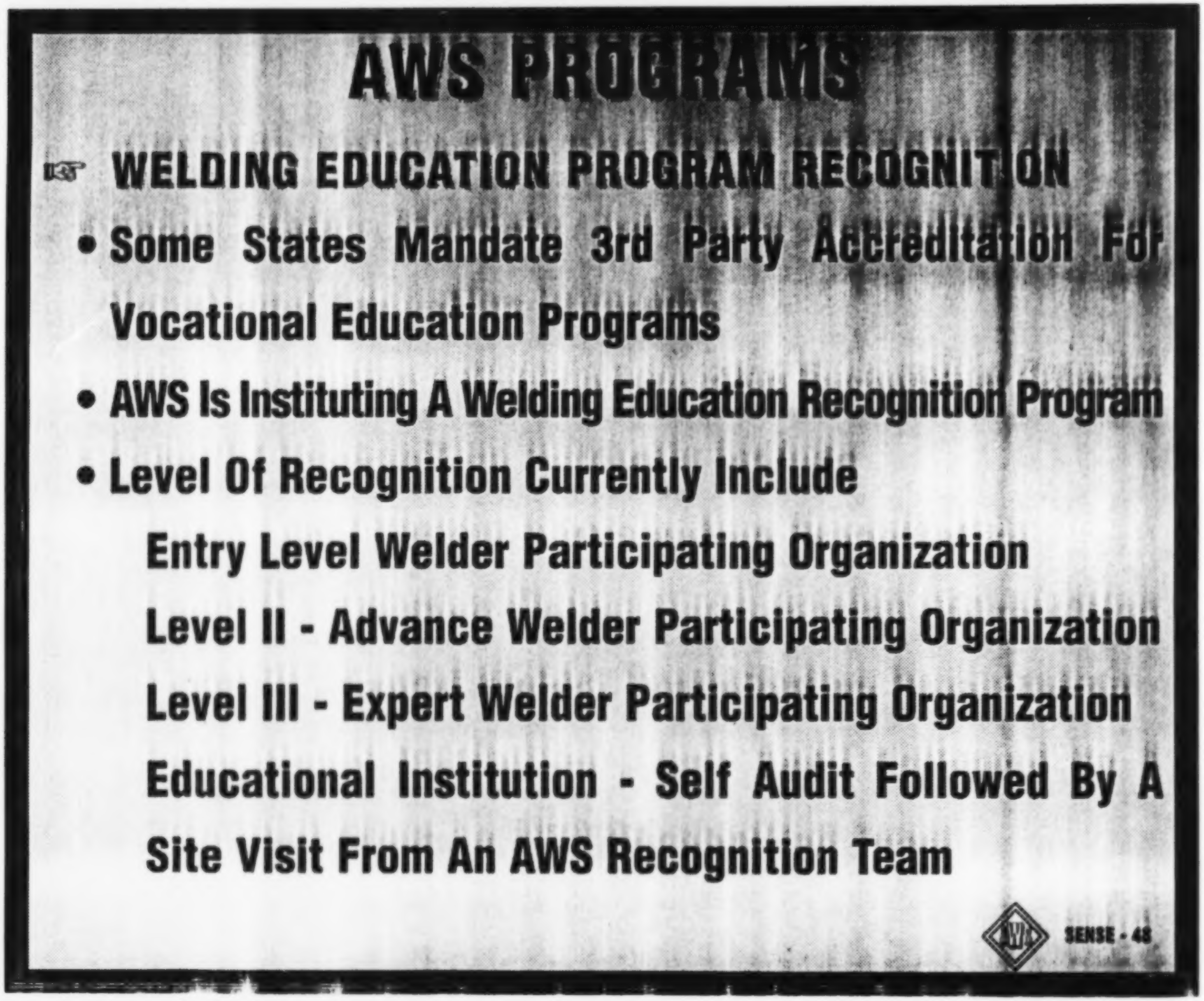


SENSE PROGRAMS

☞ BENEFITS OF PARTICIPATION

- Educators Reference Library
  Upgrades To Library At Each Additional Level
- 1 Year AWS Educational Institution Membership
  First Time Participants (Entry Level)
  PO's Maintain Membership After First Year
- Final Written Examinations Provided At Each Level
- AWS Welder Certification Upon Completion At Each Level Of Training
- Entry Into National Registry Of Welders At Each Level
- Certificates For Participating Organizations & Welders
- Training Welders To National And World Class Standards



AWS PROGRAMS

☞ **WELDING EDUCATION PROGRAM RECOGNITION**

- Some States Mandate 3rd Party Accreditation For Vocational Education Programs
- AWS Is Instituting A Welding Education Recognition Program
- Level Of Recognition Currently Include

  Entry Level Welder Participating Organization

  Level II - Advance Welder Participating Organization

  Level III - Expert Welder Participating Organization

  Educational Institution - Self Audit Followed By A Site Visit From An AWS Recognition Team

SENSE PROGRAMS

☞ **REGISTRATION OR CERTIFICATION INFORMATION**

☞ **AWS CERTIFICATION DEPARTMENT CONTACT:**

Dennis Bileca - Office Manager
Martica Ventura - Product Coordinator
Certification Department
American Welding Society

Toll-free 1-800-443-9353 ext. 273

SENSE PROGRAMS

☞ **TRAINING OR CURRICULUM INFORMATION**

☞ **AWS EDUCATION DEPARTMENT CONTACT:**

Robert V. Reeve - Director
Daniel Cantelope - Curriculum Development Manager
Education Department
American Welding Society

Toll-free 1-800-443-9353 ext. 229